TAMIL NADU AGRICULTURAL UNIVERSITY

THIRTEENTH ANNUAL REPORT

April 1, 1983 to March 31, 1984

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1. INTRODUCTION

The Thirteenth Annual Report of Tamil Nadu Agricultural University covers the period from 1.4.83 to 31.3.84. During the year sustained efforts were made to further develop the research activities which resulted in the release of 15 new crop varieties and development of low and no cost techniques for improving crop, animal and fish productivity besides fabrication of new labour saving devices to reduce the cost of production. The Directorate of Extension Education functioned in close collaboration with the Developmental Departments and farming community and effectively disseminated the research findings.

The major achievements in the fields of education, research and extension education are presented below :

Education

The following new degree programmes were started in the University

i) Ph.D. in Veterinary Physiology at the Madras Veterinary College, Madras.

ii) M.Sc. (Ag.) in Plant Protection at the Agricultural College and Research Institute, Coimbatore and

iii) Post-graduate Diploma in Plantation Crops at the Hoticultural Research Station, Thadiyankudisai.

The number of seats reserved to sons of farmers was increased from 20 to 45 for Agriculture, Horticulture, Engineering, Veterinary and Fishery Degree Programmes

Future Focus

i) Starting of another Agricultural College

ii) Starting of a Second Veterinary College

iii) M. E. (Ag.) / M. SC. (Ag.) in Water Management

iv) M. E. (Ag.) in Post-harvest Technology

v) M.V.Sc. in Dairy Technology Dairy Microbiology and Dairy Chemistry

vi) Establishment of an Advanced Centre for Soil and Crop Management Studies at Coimbatore and

vii) Establishment of an Advanced Centre for Plant Protection Studies at Coimbatore.

Research

The following new schemes were implemented during the year.

i) Strengthening of P.G. teaching and research in Agricultural Marketing Management

ii) Integrated weed management in different cropping systems

2. UNIVERSITY ADMINISTRATION

OFFICERS OF THE UNIVERSITY

Chancellor	:	Thiru S. L. Kurana His Excellency, the Governor of Tamil Nadu
Pro-Chancellor	:	Dr. K. Kalimuthu Hon'ble Minister for Agriculture
Vice-Chancellor	:	Thiru A. Venkataraman, I.A.S. (up to 29.8.83 A.N.) Dr. S. Jayaraj (Addl. charge up to 4.10.83 A.N.) Dr. V. Rajagopalan (from 5.10.83)
Registrar	:	Dr. S. Jayaraj
Comptroller	:	Thiru V. Sourirajan
Dean, Agrl. College & Research Institute, Coimbatore	:	Dr. K. R. Ramasamy
Dean, Agrl. College & Research Institute, Madurai	:	Dr. K. K. Krishnamoorthy
Dean, Madras Veterinary College, Madras	:	Dr. .V M. Ramasamy (up to 31.5 83) Dr. P. Kothandaraman (from 1.6.83)
Dean, College of Agrl. Engineering, Coimbatore and Director, Water Technology Centre, Coimbatore	:	Prof. R. K. Sivanappan
Dean, Faculty of Horticulture, Coimbatore	:	Dr. S. Muthuswami
Dean, Post-Graduate Studies, Coimbatore	:	Dr. V. D. Guruswamy Raja

Dean, Fisheries College, Tuticorin	: Dr. M. D. K. Kuthalingam (up to 9.12.83 A.N.) Dr. G. Jagatheesan (Addl. Charge from 10.12.83)
Director of Research (Agri.), Coimbatore	: Dr. M. Balasubramanian
Director of Extension Education, Coimbatore	: Dr. A. John Knight
Director School of Genetics, Coimbatore	: Dr. S. R. Sree Rangasamy
Director, Centre for Agrl. & Rural Development Studies, Coimbatore	: Dr. V. Rajagopalan (up to 4.10.83) Dr. K. R. Ramasamy (Addl. Charge from 5.10.83)
Director of Research (Animal Sciences), Madras	: Dr. S. Venkataiyan
Director, Institute of Animal Nutrition, Livestock Research Station, Kattupakkam	: Dr. P. Kothandaraman (up to 31.5.83) Dr. S. Venkataiyan (Addl. Charge from 1.6.83)
Director of Animal Health, Trichy	: Vacant

BOARD OF MANAGEMENT

Chairman

Vice-Chancellor	: Thiru A. Venkataraman, I.A.S. (up to 29.8.83) Dr. V. Rajagopalan (from 5.10.83)

Members

Commissioner & Secretary to Government

a) Agriculture Department	: Thiru T. V. Antony, I.A.S. (up to 3.7.83) Thiru V. T. Thurairaj, I.A.S. (up to 5.9.83) Thiru A. Venkataraman, I.A.S. (from 6.9.83)

b) Finance Department	:	Thiru K. J. M. Shetty, I.A.S. (up to 8.8.83) Thiru C. Ramachandran, I.A.S. (from 9.8.83)
Director of Agriculture	:	Thiru V. T. Thurairaj, I.A.S. (up to 5.7.83) Thiru U. S. Natarajan, I.A.S. (from 6.7.83)
Director of Fisheries	:	Thiru V. Sankarasubbaian, I.A.S. (up to 26.1.84) Thiru T. Lakshminarayanan, I.A.S. (from 27.1.84)
Director of Animal Husbandry	:	Thiru V. Manivannan, I.A.S. (up to 3.12.83) Dr. S. Rangaraj (from 4.12.83)
Chief Conservator of Forests	:	Thiru T. Achaya, I.F.S. (up to 31.10.83) Thiru S. Kondas, I.F.S. (from 1.11.83)
Agrl. Scientist	:	Prof. A. Subramaniam
Crop Farmer	:	Thiru A. D. Jeyam Pandian
Livestock Farmer	:	Thiru T. Ramachandran
Nominee for Agro Industries	:	Thiru K. Liakath Alikan in the capacity as Chairman, Tamil Nadu Agro-Industries Corporation Limited.
Woman Social Worker	:	Tmt. E.V.K. Sulochana Sampath
Educationist	:	Thiru K. Mohanarangam
Nominee of ICAR	:	Dr. K. Mohan Naidu in the capacity as Director, Sugarcane Breeding Institute, Coimbatore.

Member of Legislative Assembly	:	Thiru K. Kuppuswamy, M.L.A. (up to 30.1.84)
		Thiru M. Chinnaraj, M.L.A. from 22.2.84
Member of Legislative Council	:	Thiru M. Sankaralingam, M.L.C. (up to 20.4.84)

Member - Secretary

Registrar	:	Dr. S. Jayaraj

Meetings of the Board of Management

During the year under report, the Board of Management met four times viz. on April 18, 1983, July 18, 1983, October 29, 1983 and January 30, 1984. The following are some of the important decisions taken by the Board of Management at these meetings :

1. Sanctioned the implementation of new plan schemes in the University during 1983-84.
2. Sanctioned the Establisment of a scheme for offering short term training course in Meat Hygiene at the Veterinary College, Madras during 1983-84.
3. Sanctioned the implementation of ICAR Scheme viz., All India Co-ordinated Research Project on Renewable Energy sources for Agrl. and Agro-based Industries during the Sixth Plan period.
4. Sanctioned the implementation of a scheme for the Best Teacher/Best Researcher Award in the University from 1983-84
5. Sanctioned the implementation of a Scheme for the organisation of the Dairy Plant at the Dept. of Dairy Science, Veterinary College, Madras during 1983-84.
6. Sanctioned the implementation of new Plan schemes in all the Faculties of the University at an estimated cost of Rs. 50.80 lakhs during 1984-85.
7. Sanctioned two schemes fully financed by the Ford Foundation with two posts of Associate Professor of Agrl. Economics at the Dept. of Agrl. Economics, CARDS, Coimbatore.
8. Sanctioned the implementation of a scheme fully financed by the Coffee Board, Bangalore at the Horticultural Research Station, Yercaud with one post of Professor of Horticulture and one post of Asst. Professor of Horticulture.

9. Approved the change in the name of the Banana Research Centre, Vellore as University Research Centre, Vellore.

10. Sanctioned the Establishment of a Separate Communication Centre at the Veterinary College, Madras.

11. Approved the constitution of Executive Committee and steering Committee on the Water Technology Centre, Coimbatore and also the inclusion of two farmers on each of the above Committees.

12. Allotted an area of 50 cents each to the Tamil Nadu Agrl University Church Committee and Tamil Nadu Agrl. University Muslim Prayer Hall Committee inside the main campus at Coimbatore for the construction of a Church with yard and a Prayer Hall respectively for the benefit of staff members.

13. Allotted certain sites to the Tamil Nadu Agrl. University Teachers' Association and Tamil Nadu Agrl. University Non-Teaching Staff Association for the construction of office for the Associations inside the main campus at Coimbatore on a nominal rental basis.

14. Approved the acquisition of additional lands - for the Regional Research Station, Vridhachalam, Regional Research Station, Paiyur, Cotton Res. Station, Srivilliputhur and Tamil Nadu Rice Res. Institute, Aduthurai.

15. Allotted a building and site inside the Botanical Gardens of the University at Coimbatore to the Coimbatore Horticultural Club for use as office and nursery, free of cost.

16. Allotted 10 cents inside the Farm at Regional Research Station, Aruppukkottai for the construction of staff quarters by the Dept. of Agriculture under T & V Programme.

17. Allotted a site for the construction of office to the TNAU Basic Servants' (Central) Association inside the main campus at Coimbatore as in the case of other two Service Associations.

18. Approved the handing over of certain lands inside the main campus, Coimbatora to the Dept. of Agriculture for the construction of buildings.

19. Approved the taking over of 17.22 acres of lands at the State Seed Farm, Thirupathisaram from the Dept. of Agriculture for starting the NARP Regional Research Station in Kanyakumari as sanctioned by the ICAR.

20. Sanctioned the implementation of the ICAR - NARP for the Establishment of a Regional Research Station in Kanyakumari Dist. at Pechiparai during the Sixth Plan period as sanctioned by the ICAR.

21. Approved the taking over of 20 acres of lands with a borewell from the Dept. of Agriculture at Vamban in lieu of the lands transferred at Pudukottai for use by the NPRC, Vamban.

22. Approved the Revised Estimate for 1982-83 and the Budget Estimate for 1983-84 of the University as recommended by the Finance Committee.

23. Approved the Revised Estimate for 1982-83 and the Budget Estimate for 1983-84 of the KVK, Pondicherry as approved by the Managing Committee

24. Approved the Annual Report of 1981-82 of the University for sending to the Government.

25. Sanctioned the implementation of certain Government orders for the benefit of the Staff members of University.

26. Approved the adoption by the University the age limit for the appointment to first level entrance posts as per rules prescribed from time to time by the Government.

27. Sanctioned the enhancement of annual grant to the South Indian Horticultural Association from Rs. 5,000/- to Rs. 10,000/-

28. Approved the delegation of powers to the Vice-Chancellor for write off of loss due to conversion of seeds into grain and also sanctioned the write off of loss due to conversion of seeds into grain at Agrl. Research Station, Bhavanisagar and AC&RI, Madurai of Rs. 67,157/- and Rs. 51,066.13 respectively.

29. Approved the delegation of powers to the Vice-Chancellor for sanctioning of lease of lands.

30 Approved the payment of enhanced rates of rental and catering charges at Tamil Nadu House as ordered by the Government and also the payment of TA and DA from University funds to the scientists who go on tour to Delhi duly remitting the TA and DA they obtained from the outside agency in to the University funds.

31. Approved the amendment to the Hostel rules for incurring expenditure on maintenance and running of hostels over and above the amount collected from the students.

32. Approved the disposal of the Gas Plant at the AC & RI, Madurai and write off of loss of Rs 2.99 lakhs.

33. Approved the reimbursement of charges incurred on clinical tests without insisting on going to Government Hospitals within the ceiling of one month's Pay and DA per annum.

34. Approved the payment of special compensatory allowance to the Staff working at the Horticultural Research Station, Yercaud.

35 Decided to treat the former Vice-Chancellors of the University as University Guests and to have their portraits at the expense of the University.

36. Approved the payment of lumpsum amount in lieu of sanction of advance increment for passing of tests.

37. Approved the proposals to start a third Agri. College and a second Veterinary College in the State by the University with an admission strength of 80-100.

38. Approved the proposal to make provision in the TNAU Act, Statutes, Regulations and Rules for the award of Degree of Doctor of Science (D.Sc.)

39. Increased the value of TNAU Merit scholarship to Rs. 400/- p.m. on par with ICAR scholarships and also approved the institution of one Merit Scholarship for the M.F.Sc. Degree programme at Tuticorin.

40. Approved the admission strength, qualifications and rules for admission into the Under-graduate and Post graduate degree programmes of the University for the academic year 83-84.

41. Approved the proposal to admit the Pure Science graduates into the PG programmes in the University in allied subjects.

42. Increased the admission strength by 10 seats for B.Sc (Ag.) degree programme from the academic year 1983-84 onwards.

43. Approved the increase in the reservation of seats by 20 seats in addition to the 11 seats already available for admission of the candidates of the Dept. of Animal Husbandry into the M.V.Sc. degree programme at Veterinary College, Madras.

44. Approved the increase in admission strength from 25 to 30 and from 9 to 12 in respect of M.Sc. (Ag.) degree in Agri. Botany and Agronomy respectively during the academic year 83-84.

45. Approved the increase in the reservation of seats by 25 in regular quota and 40 seats under T & V quota for admission of the officers of the Dept of Agriculture into M. Sc. (Ag.) degree programme.

46. Approved the increase in the reservation of seats for admission of the children of the farmers fishermen in Under-graduate degree programmes as ordered by the Government.

47. Approved the reservation of 5 seats for children of the Planters in B.Sc.(Hort.) degree programme.

48. Approved the admission of Sri Lanka Tamil students in the B. Sc. (Ag.) degree programme after getting concurrence from the Government.

49. Approved the establishmant of a Students' Aid Fund in the colleges of the University.

50. Approved the creation of certain posts.

51. Approved the upgradation of one out of the three posts of Assistant Professors into Associate Professor each at the Farmers Training Centre, Hosur and Pudukkottai.

52. Approved the upgradation of the post of Assistant Engineer (Dairy)

into Assistant Executive Engineer (Dairy) for the Dairy Plant at the Dept. of Dairy Science, Veterinary College, Madras.

53. Approved the creation of the following new cadres in the University :

    a) Junior Agricultural Officer.

    b) Laboratory Technician for Agrl Wing as in Veterinary Wing.

    c) Supervisor (Vehicles).

54. Approved the panel of names of outside experts for Staff Selection Committees in the University.

55. Approved the recommendations of the Sub-Committee of the Board of Management for the appointment of part-time Medical Officers in the out stations of the University.

56. Approved the revised qualifications for the post of Boilerman at Veterinary College, Madras.

57. Approved the revised constitution of Selection Committee for recruitment to the posts of Asst. Professor in the University.

58. Approved the qualifications for the posts of Special Attenders, Asst. Executive Engineer (Dairy) and Mill Operator in the University.

59. Approved the implementation of the modalities for the absorbtion of the transferred personnel alongwith the Research Stations to the University with effect from 1.4.81.

60. Approved the purchase of apparatus and equipments and sanctioned expenditure.

61. Sanctioned expenditure for civil works.

ACADEMIC COUNCIL

Chairman

Vice-Chancellor	:	Thiru A. Venkataraman, I.A.S. (up to 29.8.83) Dr. S. Jayaraj (Addl. Charge up to 4.10.83) Dr. V. Rajagopalan (from 5.10.83)

Members

Commissioner and Secretary to Government, Agriculture Department	:	Thiru T. V. Antony, I.A.S. (up to 3.7.83) Thiru V. T. Thurairaj, I.A.S. (up to 5.9.83) Thiru A. Venkataraman, I.A.S. (from 6.9.83)

Deans		Dr. K. R. Ramaswamy Dean, Agrl. College & Research Institute Coimbatore
		Dr. K. K. Krishnamoorthy Dean, Agrl. College & Research Institute Madurai
		Prof. R. K. Sivanappan Dean, College of Agrl. Engineering Coimbatore
		Dr. V. M. Ramaswamy Dean, Madras Veterinary College Madras (up to 31.5.83)
		Dr. P. Kothandaraman Dean, Madras Veterinary College Madras (from 1.6.83)
		Dr. M. D. K. Kuthalingam Dean, Fisheries College Tuticorin (up to 9.12.83)
		Dr. G. Jegatheesan Dean, Fisheries College Tuticorin (Addl. Charge from 10.12.83)
		Dr. P. Chandrasekaran Dean, Post-graduate Studies Coimbatore (up to 3.4.83)
		Dr. V. D. Guruswamy Raja Dean, Post-graduate Studies Coimbatore (from 4.4.83)
		Dr. S. Muthuswami Dean, Faculty of Horticulture Coimbatore
Director of Research (Agri)	:	Dr. M. Balasubramanian
Director of Research (Animal Sciences)	:	Dr. S. Venkataiyan
Director of Extension Education	:	Dr. A. John Knight

Director, CARDS :	Dr V. Rajagopalan (up to 4.10 83) Dr. K. R. Ramaswamy (Addl. Charge from 5.10.83)
Director, School of Genetics :	Dr. S. R. Sree Rangasamy
Six members among the Heads : of Departments nominated by the Vice-Chancellor	Prof. K. R. Swaminathan Professor and Head Department of Agro Energy Coimbatore (up to 21.11.83) Dr. V. Subramanian Professor and Head Department of Agrl. Processing Coimbatore (from 22.11.83) Dr. V. D. Guruswamy Raja Professor and Head T.R.R.I., Aduthurai (up to 3.4.83) Dr. R. Appadurai Professor School of Genetics Coimbatore (from 25.5.83 to 21.11.83) Dr. P. Chandrasekaran Professor and Head Department of Forage Crops Coimbatore (from 22.11.83) Dr. P. Ayyaluswami Professor and Head Department of Animal Nutrition Veterinary College, Madras (up to 31.10.83) Dr. R. Ramamurthi Professor and Head Department of Meat Hygiene & Technology Veterinary College, Madras (from 22.11.83) Dr. R. A. Balaprakasam Professor and Head Department of Microbiology Veterinary College, Madras (up to 30.9.83)

Dr. V. Ulaganathan
Professor and Head
Department of Animal Genetics
Veterinary College, Madras (from 20.10.83)

Dr. C. A. Gopalakrishnan
Professor and Head
Department of Animal Husbandry
Agricultural College & Research Institute
Madurai (from 22.11.83)

Dr. K. G. Shanmugavelu
Professor and Head
Department of Horticulture
Agricultural College & Research Institute
Madurai (from 22.11.83)

Dr. P. Natarajan
Associate Professor and Head
Department of Fish Culture
Fisheries College, Tuticorin

Three members having special knowledge or practical experience in different aspects of agriculture nominated by the Vice-Chancellor :	Dr. C. N. Sambandam Professor and Head Department of Agricultural Botany Annamalai University, Annamalainagar (up to 21.11.83)
	Prof. A. R. Lakshmanan Dean, College of Agriculture Annamalai University, Annamalainagar (from 22.11.83)
	Dr. R. Sakthivadivel Director, Centre for Water Resources College of Engineering Perarignar Anna University of Technology Madras (up to 21.11.83)
	Dr. R. Ramaiah Professor and Head Department of Agricultural Engineering University of Agricultural Sciences Dharwad (from 22.11.83)

Prof. A. Gnanam
Professor of Plant Pysiology
School of Biological Sciences
Madurai Kamaraj University, Madurai

Secretary : Dr. S. Jayaraj
Registrar.

Meetings of the Academic Council

The Academic Council met four times during the year under report. The following important decisions were taken

1. Recommended the proposal of starting a new Agricultural College in the University.

2 Recommended the proposal of starting a second Veterinary College in the University.

3. Approved the proposal in principle for conducting short term training course in the Department of Meat Hygiene, Madras Veterinary College, Madras.

4. Considered new plan schemes for 1983-84 and 13 schemes under Agriculture, 6 schemes under Veterinary and one under Fisheries and recommended the implementation

5 Eighteen new plan schemes under Agriculture and 9 under Veterinary and Animal Sciences were recommended for implementation during 1984-85.

6. Recommended the implementation of the scheme funded by the Coffee Board.-

7. Accepted the proposal on the upgradation of TRRI, Aduthurai by positioning a Director in the cadre of University Officer.

8. The teaching activities of the Departments of Home Science, Soil Science and Agricultural Chemistry, Agricultural College & Research Institute, Madurai and the teaching and research activities of the Department of Obstetrics and Gynaecology, Madras Veterinary College, Madras were recommended for strengthening.

9. Recommended for upgradation of the Paddy Experiment Stations, Tirur and Ambasamudram and Farmer's Training Centres, Hosur and Pudukkottai by positioning Professors and Associate Professors respectively.

10 Recommended the creation of the post of Professor of Microbiology at the Main Campus and Professor of Horticulture for the Horticultural Research Station, Periakulam.

11. Recommended the proposal for the creation of two more Director of Research (Agri) at Cuddalore and Madurai.

12. Recommended the formation of a communication centre at the Madras Veterinary College, Madras.

13. Approved the recommendations of the steering committee of the Water Technology Centre for the creation of Visiting Professorship.

14. Recommended deputation of University employees for Post-Doctoral

Fellowship / Assignment / Short Visits / Scholarship programmes without any financial commitment to the University.

15. Accepted the views of the ICAR in respect of admission of Diploma holders into B.E.(Ag.) degree programme

16. Prescribed age limit of candidates for admission to Post-graduate Diploma course in Sericulture

17. Approved the results of Post-graduate/Under graduate Diploma programmes

18. Approved the academic robes for the Post-graduate diploma course in Sericulture, Post-graduate course in Agricultural Business Management at the Convocation.

19. Accepted the recommendations of the Committee constituted by the Government on the common selection of candidates to professional courses.

20. Approved the recommendation of the Deans and Directors in regard to readmission, re-registration and supplementary examinations in the Under-graduate degree programme

21. Approved certain recommendations of the Workshop on Post-graduate Education and Research.

22. Recommended the admission strength, rules and qualification for various Post-graduate degree programmes of Tamil Nadu Agricultural University for the Academic year 1983-84.

23. Accepted and recommended the reservation of 20 seats (in addition to 11 seats already reserved) in M.V.Sc. for the departmental candidates.

24. Recommended certain suggestions for admitting all other pure science graduates working in Tamil Nadu Agricultural University for Post-graduate courses.

25. Increased the admission strength of M.Sc. (Ag.) in Agricultural Botany from 25 to 30 during the academic year 1983-84.

26. Accepted the recommendation for the deletion of certain rules relating to Hostel.

27. Accepted the increased admission strength of certain programmes at Post-graduate level.

28. Approved the increased admission strength in the B. V. Sc. degree programme during the year 1983 - 84 from 116 to 117.

29. Accepted the rules for the establishment of Students' Aid Fund in Tamil Nadu Agricultural University.

30. Approved the rules for the institution of certain Scholarships / Prizes and Medals.

31. Accepted the institution of one Tamil Nadu Agricultural University Merit Scholarship for M. F. Sc. degree programme.

32. Nominated Thiru K. Chockalingam, I. A. S., Chief Secretary to Government of Tamil Nadu to be a member of the Three-Man Committee to prepare a panel of names for the appointment of Vice-Chancellor.

33. Recommended the report of the Dean, College of Agricultural Engineering on the duties and responsibility of the visiting Professor.

34. Decided that Master's degree may be prescribed for the recruitment of Assistant Professors.

35. Accepted the revised proforma for the award of Best Teacher Best Researcher in the University.

Board of Studies

The Board of Studies in Agriculture, Agricultural Engineering, Veterinary and Animal Sciences, Horticulture, and Fisheries Science constituted during the year 1982 continued during 1983, the period under report. Each Board of Studies consisted of the following members.

1. Dean of the Faculty ... Chairman
2. Other Deans in the Faculty
3. Heads of Departments in the Faculty
4. All the Professors in the Faculty
5. Two elected representatives from among the Associste Professors and four from among the Assistant Professors.
6. Two experts in the concerned subjects from outside the University nominated by the Vice-Chancellor.
7. One or more Deans of other Faculties of the University nominated by the Vice-Chancellor.

Faculty of Agriculture

Elected Members

i. Dr S. Rajasekaran,
Associate Professor of Agrl. Botany,
Agrl. College & Research Institute,
Madurai.

ii. Thiru K. Saivaraj,
Associate Professor of Agrl. Entomology,
Agrl. College & Res. Institute,
Coimbatore

iii. Thiru A. Balasubramanian,
Assistant Professor of Agronomy,
Agrl. College & Res. Institute,
Coimbatore.

iv. Thiru T. L. Baskaran,
Assistant Professor of Plant Pathology,
Agrl. College & Res. Institute,
Coimbatore.

v. Thiru M. Swamiappan,
Assistant Professor of Agrl. Entomology,
Agrl. College & Res. Institute,
Madurai.

vi. Thiru S. Jebaraj,
Assistant Professor of Agrl. Botany,
Agrl. College & Res. Institute,
Madurai.

Nominated Members

i. Prof. A. R. Lakshmanan.
Dean,
College of Agriculture.
Annamalai University,
Annamalainagar.

ii. Dr. R B. Patil,
Director of Instructions (Agri.),
College of Agriculture,
Dharwad.

Meetings

This Board of Studies conducted mettings twice during the year and recommended the following to the Academic Council

1. Considered the new courses in Agricultural Statistics for Post-graduate students

2. Considered the modification in curricula and syllabi for M. Sc. (Ag. Sugarcane Production.

3. Approved the revised syllabus for the two year diploma course in Agriculture offered by Sri Ramakrishna Mission Vidyalaya.

4. Considered the new course in Agronomy under 800 series.

5. Approval of certain courses in the revised syllabus as equivalent courses.

6. Approved restructured syllabus for the IV B Sc. (Ag) to be introduced from 1983-84.

7. Starting of new Post-graduate degree programme leading to M. Sc. (Ag.) Plant Protection from the academic year 1983 84.

8. Increased the admission strength in M. Sc. Food Science & Nutrition Programme.

9. Inclusion of Village-Stay Programme for the Final B Sc. (Ag.) students.

10. Approval of equivalent courses for 400 series for Final B. Sc (Ag.) class.

11. Approved the new course and modification of the existing course of M. Sc. (Ag) and Ph. D. in Agronomy.

12. Recommended time limits for submission of M. Sc. (Ag.) and Ph.D. thesis.

13. Approval of starting a new Post-graduate programme leading to M. Sc (Ag.) in Farming System Management

14. Approval of starting Post-graduate diploma course in Seed Production Technology

15. Approval of the revised syllabus for the course M. Sc. (Ag) in-Agronomy.

Faculty of Agricultural Engineering

Elected Members

i. Thiru M. Balasubramanian.
Associate Professor,
College of Agricultural Engineering,
Coimbatore-3.

ii. Thiru R. Manian,
Associate Professor,
College of Agricultural Engineering,
Coimbatore.

iii. Thiru K Rangasamy,
Assistant Professor,
College of Agrl. Engineering,
Coimbatore.

iv. Thiru R. Kailappan,
Assistant Professor,
College of Agricultural Engineering,
Coimbatore.

v. Thiru K. Arumugam,
Assistant Professor,
College of Agricultural Engineering,
Coimbatore.

vi. Thiru K. Raju,
Assistant Professor,
College of Agricultural Engineering,
Coimbatore

Nominated Members

i. Dr. R. Lal,
Dean,
College of Agricultural Engineering,
Orissa Agricultural University,
Bhubaneswar.

ii. Thiru G. Ramana Reddy,
Professor and Head,
Department of Agri. Engineering,
Andhra Pradesh Agrl. University,
Rajendranagar

Meetings

The Board of Studies conducted one meeting during the year and recommended the following to the Academic Council.

i. Approved the courses in the restructured syllabus as equivalent to the courses in the old syllabus.

ii. Approved the syllabus contents for the IV B. E. (Ag.).

iii. Approved the new Post graduate programme in Agricultural Engineering.

iv. Instituted a prize to Final B. E. (Ag.) students for the Best Project work.

Faculty of Veterinary and Animal Sciences

i. Dr. B.M. Eswaran,
Associate Professor of Animal Genetics,
Madras Veterinary College,
Madras.

ii. Dr. P.A. Balu,
Associate Professor of Clinics,
Madras Veterinary College,
Madras

iii. Dr. R.S. Viswanathan,
Assistant Professor of Livestock Production and Management,
Madras Veterinary College,
Madras.

iv. Dr. P. Dhanapalan,
Assistant Professor of Therapeutics,
Madras Veterinary College,
Madras

v. Dr. R. Subramanian,
Assistant Professor of Extension,
Madras Veterinary College,
Madras.

vi. Dr. P. Thangaraju,
Assistant Professor,
Directorate of Research (An. S.)
Madras

Nominated Members

i. Dr. A. Rama Mohana Rao,
Professor and Head,
Department of Animal Genetics,
College of Veterinary Sciences,
Tirupathi.

ii. Dr. M. Krishnan Nair,
Dean,
College of Veterinary Sciences,
Mannuthy, Trichur.

Meetings

The Board of Studies conducted a meeting during this year and recommended the following to the Academic Council.

i. Introduction of M.V.Sc. course in "Dairy Technology", Dairy Microbiology" and "Dairy Chemistry".

ii. Approval of Post-graduate training course in 'Sheep and Wool Sciences" at Sheep Breeding Research Station, Sandynallah.

iii. Alteration of credit hours of certain Post-graduate courses of Animal Husbandry Economics.

iv. Deletion and addition of Post-graduate courses in the subject of Preventive Medicine

v. Alteration of credit hours of certain B.V.Sc and Ph.D courses in the subject of Microbiology.

vi. Inclusion of Preventive Medicine in Hospital Training.

vii Inclusion of Biological Training for the Fifth B.V.Sc. stuedents.

viii. Consideration of the regulation, programmes and syllabus for internship period for B.V.Sc. students admitted under revised regulations of Trimester system

ix. Approval of course Numbers and credits alloted to All India Study Tour.

Faculty of Horticulture

Elected Members

1. Thiru V. Palanisamy,
   Associate Professor,
   Faculty of Horticulture,
   Coimbatore
2. Dr. (Mrs.) Seemanthini Ramdas,
   Associate Professor,
   Faculty of Horticulture,
   Coimbatore.
3. Thiru P. Selvaraj,
   Assistant Professor,
   Faculty of Horticulture,
   Coimbatore.
4. Thiru T. Thangaraj,
   Assistant Professor,
   Faculty of Horticulture,
   Coimbatore
5. Thiru E. Vadivel,
   Assistant Professor,
   Faculty of Horticulture,
   Coimbatore.
6. Thiru L.R. Rajasekaran,
   Assistant Professor of Horticulture
   Agrl. College and Res. Institute,
   Madurai.

Nominated Members

1. Dr. U.V. Sulladmath,
   Professor and Head,
   Department of Horticuture,
   University of Agricultural Sciences
   GKVK Campus, Bangalore.
2. Dr. P.C. Sivaraman Nair,
   Director of Research,
   Kerala Agricultural University,
   Vellanikara,
   Tiruchur.

Meetings

The Board of Studies conducted twice during this year and recommended the following to the Academic Council.

i Approval of the restructuring of of the courses in Plantation Crops for introducing subjects on "Coffee" in the B.Sc (Hort.) Degree Programme.

ii. Approval of the study of extra credit load registered by the Final Year students.

iii. Approval of the excess and deficit credits registered by the Final Year students.

iv Introduction of a new course in Landscape Design for M.Sc. (Hort.)

v. Model syllabus for degree programme in Plantation Crops and short duration programmes for Coffee and Rubber.

vi. Reduction in the credit hours of certain Ph.D. courses.

vii. Approval of the restructured courses for M. Sc (Hort.) degree programme.

viii. Approval of the courses on Coffee to the B. Sc. (Hort.) degree programme.

x. Approval of the revised qualification prescribed for the Post-graduate Diploma course in Plantation Crops.

Faculty of Fisheries

Elected Members

i. Dr. G. Jegatheesan,
Associate Professor,
Fisheries College,
Tuticorin.

ii. Dr. N. Sukumaran,
Assistant Professor,
Fisheries College,
Tuticorin.

iii. Dr. V. Sundararaj,
Assistant Professor,
Fisheries College
Tuticorin

iv. Dr R Santhanam,
Assistant Professor,
Fisheries College,
Tuticorin

v. Thiru C Rathnam Nadar,
Assistant Professor,
Fisheries College,
Tuticorin.

Nominated Members

i. Prof. H.P.C. Shetty,
Director of Instructions,
College of Fisheries,
Mangalore.

ii. Prof R. Natarajan,
Director,
Centre of Advanced Studies in Marine Biology,
Annamalai University, Portonovo.

Meetings

The Board of Studies did not convene any meeting during the period under report.

Recognition Committee

The Recognition Committee met twice during the period under report and recommended the following to the Academic Council

i. Recognized the M. A. degree (Zoology) possessed by Tvl. A. V. Rangarajan and S. Vijayaraghavan as equivalent to the Master of Science of the Tamil Nadu Agricultural University for the purpose of admission to Ph.D. programme of Tamil Nadu Agricultural University as a special case.

ii. Recognized the B. Sc. (Ag.) degree offered by the Prince of Songhla University, Thailand for the purpose of admission to the Post-graduate programme of Tamil Nadu Agricultural University

iii. Recognized the Pre-medical course of the University of Indore, as equivalent to the HSC/PUC of Tamil Nadu for the purpose of admission to the Under-graduate courses in the Tamil Nadu Agricultural University.

iv. Recognized the D. Sc. degree awarded by the Paul Sabatiar University, Toulouse, France as equivalent to Ph.D., degree of Tamil Nadu Agricultural University.

v. Recognized the GCE of Malaysian Government as equivalent to PUC/HSC of Tamil Nadu for the purpose of admission to the B.V.Sc programme of the Tamil Nadu Agricultural University.

vi. Recognised the B Sc. (Ag.) degree of Tribhuvan University, Nepal for the purpose of admission to the Post-graduate programme of the Tamil Nadu Agricultural University under GOI quota

vii. Recognised the Kenya Advanced Certificate of Education as equivalent to PUC/HSC of Tamil Nadu Agrl. University under Government of India quota.

viii. Recognised the Secondary School Certificate of Likuni, Malawi as equivalent to HSC of Tamil Nadu for the purpose of admission into Under graduate programme of Tamil Nadu Agricultural University.

Board of Examinations

The Board of Examinations met twice during the year under report. The following decisions were taken.

1. Ratified the action taken on the dates fixed for the receipt of applications and commencement of June, 1983 and December 1983 B.V.Sc., Supplementary examinations

2. Ratified the changes made in the appointment of External / Internal Examiners for June, 1983 and December 1983 B.V.Sc. Supplementary Examinations.

3. Revised, moderated and provisionally declared the results of June, 1983 and December, 1983 B. V. Sc. Supplementary Examinations.

Courses and Curricula

The trimester system of education was followed for all the Under-graduate and Post-graduate degree programmes and Ph.D. programme of all disciplines offered by this University.

Students Admission

A total of 9730 application forms prescribed for the degree courses in

Agriculture, Horticulture, Veterinary Science Agricultural Engineering, Home Science and Fisheries Science were received. Among them, 4382 applications were for 212 seats in the I year B.Sc. (Ag.) i. e., 122 at Coimbatore and 90 at Madurai; 733 applications for 40 seats in the I Year B Sc. (Horticulture); 1552 applications for 115 seats in the I Year B.V.Sc., 551 applications for 20 seats in the I Year B F Sc., and 2427 applications for 75 seats in the I Year B.E. (Ag.) For seeking admission for 20 seats in the I Year B. Sc. (Home Science), 85 applications were received

With regard to Post-graduate degree programmes, 239 applications were received for 215 seats in M.Sc. Ag.) There were 12 applications against 10 seats in M. E. (Ag.) degree programmes. There were 8 applications against 5 seats in M.F.Sc. degree programme and 313 applications were received against 40 seats in Post-graduate Diploma in Sericulture. There were 224 applications against 84 seats in Ph.D. degree programmes in the faculties of Agriculture, Horticulture and Animal Sciences.

The following Committes were appointed by the Vice-Chancellor for the selection of candidates to various Under-graduate degree programmes

B.Sc. (Ag.) - Coimbatore Centre	:	Dr. K. R Ramasamy Dr. M. Balasubramanian Dr. V. D. Guruswamy Raja Dr. S. Muthuswami and Thiru K. Muthuswamy.
Madurai Centre	:	Dr. K. K. Krishnamoorthy Dr. A. John Knight Dr. V. Rajagopalan and Thiru A. Abubucker.
B.Sc. (Hort.)	:	Dr. S. Muthuswami Dr. S. Jayaraj and Thiru M. Govindarajan.
B.F.Sc.		Dr. G. Jegatheesan Dr. S. R Sree Rangasamy and Thiru A. D. Isac Rajendran.
B.V.Sc.	:	Dr. Kothandaraman Dr. S. Venkataiyan and Dr. S. P. Anbumani.
B.E. (Ag.)	:	Prof. R. K. Sivanappan Dr. G. Oblisamy and Thiru K. Narasimhan.

B.Sc. (Home Science)	Dr. V. D. Guruswamy Raja Dr. S. Neelakantan and Tmt. Sushila Thirumaran.
Post-graduate Diploma in Sericulture	Dr. V. D. Guruswamy Raja Dr. T. Kumaraswami Thiru T. M. Vasudeva Nambisan and Dr S. Jayaraj.
M.Sc. Ag) and Ph.D	Dr. V. D Guruswamy Raja Dr. K. R. Ramasamy Dr. S. Jayaraj and Prof. of the concerned Department.
M.Sc. (Hort) and Ph.D.	Dr. S. Muthuswami Dr. V D. Guruswamy Raja Dr. S. Jayaraj and Prof. of the concerned Department.
M.E. (Ag.)	Prof. R. K. Sivanappan Dr. V. D. Guruswamy Raja Dr. S. Jayaraj and Prof. of the concerned Department.
M.V.Sc. and Ph.D.	Dr. P. Kothandaraman Dr. V. D. Guruswamy Raja Dr. S. Jayaraj and Prof. of the concerned Department.

The candidates selected for admission by the above committee were approved by the Vice-Chancellor. The classes commenced on 1.12.83 for all the M.Sc (Ag.), M.Sc. (Hort.), M.E.(Ag.), and M V.Sc. and on 12.3.84 for Post-graduate Diploma in Sericulture course. The classes for Ph.D Agri. and Veterinary commenced on 14.5 84.

University Examinations

The University Examinations for the Supplementary students of the III, IV and Final year B V. Sc. examinations were conducted in June 83, and December, 1983. The results were published during July 83 and January 1984 respectively.

Trimester System of Education

During the year under report, 199 B.Sc.(Ag.), 29 B.Sc.(Hort.), 16 B.F.Sc., 121 B V.Sc., 38 B.E.(Ag.), 14 B.Sc.(HS), 6 M.Sc. (Hort.), 102 M.Sc. (Ag.), 58 M.V.Sc., 12 M.E.(Ag.), 39 Post-graduate Diploma in Sericulture and 50 Ph. D. students successfully completed their degree programmes.

Seminars and Workshops

1. Southern Regional Agricultural Information Communication Workshop was organised at Coimbatore from 19th to 23rd April, 1983.

2. Scientific Workers' Conference on oil seeds was conducted on 29th and 30th April, 1983 at Coimbatore.

3. Scientific Workers' Conferences on Agriculture and Horticulture were held on 16th to 17th May 1983 and 19th to 20th May, 1983 at Coimbatore respectively.

4. National Seminar on "Breeding Crop Plants for Resistance to pests and Disease" was conducted at Coimbatore from 25th to 27th May, 1983.

5. Seminar on "Post Harvest Technology" was conducted between 1st and 8th July, 1983 at Coimbatore.

6. Workshop on "Extension Management" was organised by Directorate of Extension. Ministry of Agriculture, Government of India, at the Kumaraperumal Farm Science Centre, Trichy from 4th to 8th July, 1983.

7. National Seminar on "Pesticide and Environment" was organised on 4th and 5th August 1983 at Coimbatore.

8. National Seminar on "Future Strategy for Development of Arid and Semi Arid Zone Fruits" was organised on 18th and 19th August, 1983, at Coimbatore.

9. Seminar on "Preservation of Meat in Tropical Countries" was held from 20th to 22nd October, 1983 at Madras.

10. National seminar on "Energy for Rural Development" was held at Coimbatore on 10th and 11th November, 1983.

11. Tenth Annual Smyposium and Conference of the Indian Poultry Science Association was held at Madras Veterinary College, Madras on 15th December, 1983.

12. Biennial workshop of All India Coordinated Cotton Improvement Project was held from 8th to 11th February, 1984 at Coimbatore.

13. Seminar on District Credit Plan by Canara Bank was conducted on 16th to 18th February, 1984 at Coimbatore.

14. Scientific Workers' Conference in Horticulture was held on 2nd and 3rd March, 1984 at Coimbatore.

15. National Seminar on "Papaya and Papain production" was held on 26th and 27th March, 1984 at Coimbatore.

Special Lectures

The following special lectures were delivered by Scientists from different countries.

	Name of the Scientist	Topic
1.	Dr. P. Palaniswamy, Entomologist, National Research Council, Canada.	Role of pheromones in insect pest management
2.	Dr. Pearson, Professor of Biology Pennsylvania State University, USA.	Behaviour of Cicindelid beetles.
3.	Ms. Andre, Giessen university, West Germany	Feeding preference of bats with special reference to insects.

"Effect of custard apple oil, neem oil and mixture on survival of [illegible] and Rice Tungro Transmission".

Thiru K. Singaravadivelu, Scientist, Paddy Processing Research Centre, Thiruvarur was awarded the "Young Scientist Award" for 1982 by the Association of Food Scientists and Technologists (India) for his work on minimising losses in rice processing.

The following Scientists from Department of Microbiology visited different countries for different purposes

1. Dr. A. Balasubramanian, Professor visited Rothamsted Experimental Station, Harpenden, England under a UNDP Fellowship training.

2. Dr. S. Kannaiyan, Associate Profdssor of Microbiology attended the Rice Research Conference at *International Rice Research Institute*, Manila, Philippines. held during April 18-22, 1983 and participated in the group discussion on Azolla.

3. Dr. M. Rangarajan, Professor of Microbiology visited NifTAL, University of Hawaii, U. S. A under UNDP Fellowship training. He also visited International Rice Research Institute, Manila.

4. Dr. D. Purushothaman, Associate Professor of Microbiology visited the University of Florida, U. S. A. under the UNDP Fellowship training.

5. Thiru P. Santhanakrishnan, Associate Professor of Microbiology left for New Zealand under the UNDP/FAO fellowship training at the Horticultural Research Station, Pekekohe

6. Thiru J. Prabakaran, Assistant Professor of Microbiology left for U. S. A. in connection with his UNDP FAO Fellowship training at Charles F. Kettering Research Laboratory, Yellow Springs, Chio, U. S. A.

7. Dr. K. Ramaswamy, Associate Professor of Microbiology left for U. S. A. in connection with his UNDP FAO fellowship training at Department of Microbiology and Public Health, Michigan State University, East Lansing, Michigan, U. S. A.

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Improtant Events

Thiru. U. S. Natarajan, I. A. S., Director of Agriculture, TamilNadu inaugurated the M.Sc. (Ag.) Plant Protection Course on 21. 11. 83.

Dr. K. Kalimuthu, Honourable Minister for Agriculture, and Thiru A. Venkataraman, I. A. S., Commissioner and Secretary to Government, Department of Agriculture, participated in the Field Day on Rainfed Farming on 20. 12 83 at Coimbatore.

The Silver Jubilee Celebration of the Horticultural Research Station, Periyakulam was celebrated on 18th December, 1983.

Dr. K. Kalimuthu, Honourable Minister for Agriculture and Dr. V. Rajagopalan, Vice-Chancellor, Tamil Nadu Agrl. University participated in the Farmers' Day Celebrations of Agrl. College and Res. Institute, Madurai on 21. 1. 84.

Honourable Ministers Thiru. P. Kulandaivelu and Thiru S. Thirunavukkarasu delivered special addresses during the inauguration function of the Madras Veterinary College students' union, Madras on 6. 1. 84.

The State Horticultural productivity Committee was inaugurated on 5.3.84 by the Vice Chancellor.

Visitors to Tamil Nadu Agrl. University

His excellency, the Governor of TamilNadu visited the Agricultural Research Station, Bhavanisagar on 11. 7. 83.

Five Board Members of Haryana Agricultural University, Hissar visited Tamil Nadu Agrl. University main campus at Coimbatore on 13. 10. 83.

Thiru P. Prathap Reddy, Vice-Chancellor, Andhra Pradesh Agricultural University visited Madras Veterinary College, Madras.

Prof. T. Ramachandran, Vice-Chancellor, Madurai - Kamaraj University visited the Horticultural Research Station, Periyakulam on 24. 5. 83 and 7. 7. 83.

Staff Activities

Dr. V. Mariappan, Associate Professor of Plant Pathology was awarded a prize of 1000 pesos by the pest control council of the Philippines in recognition of the merit of his paper entitled

"Effect of custard apple oil, neem oil and mixture on survival of Nephotettix virescens and Rice Tungro Transmission".

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6. Thiru J. Prabakaran, Assistant Professor of Microbiology left for U. S. A. in connection with his UNDP FAO Fellowship training at Charles F. Kettering Research Laboratory, Yellow Springs, Ohio, U. S. A.

7. Dr. K. Ramaswamy, Associate Professor of Microbiology left for U. S. A. in connection with his UNDP FAO fellowship training at Department of Microbiology and Public Health, Michigan State University, East Lansing, Michigan, U. S. A.

Finance and Accounts

The following statement indicates the classified summary of the transactions of the university during 1983 84

(Rs. in lakhs)

Details		Amount
Opening balance as on 1.4 83		252.04
Receipts		
Grant : State Government		
Agriculture Grant	389.49	
Veterinary Grant	197.65	
Fisheries Grant	29.49	
		616.63
ICAR Grant		
For Agricultural Research Schemes	189.27	
For Development grant	--	
For Veterinary Research Schemes	12.01	
Grants to Krishi Vigyan Kendra, Pondicherry	9.40	
		210.68
Government of India Grant		
For Agricultural Research Schemes	17.08	17.08
Outside Agencies		
For Foreign and Indian Agencies Research Schemes	30.01	
For National Service Scheme	--	
		30.01
Other Receipts		
Agriculture : Fees, Rent, Farm receipts etc.	158.57	
Veterinary -do-	1.97	
Fisheries -do-	--	
Other deposits (Scholarship etc.) including Loans and Advances	33.45	
State Government Loan for House Building Advance	15.00	218.99
Total		1345.43

Expenditure

(Rs. in lakhs)

Sl. No.	Details	Amount
1.	University Administration	59.16
2.	Estate Office	28.18
3.	Capital Works (Agri.)	32.80
4.	Agricultural College & Research Institute, Coimbatore	84.12
5.	Faculty of Horticulture	22.10
6.	School of Genetics	33.68
7.	Post Graduate Studies	5.51
8.	CARDS. Coimbatore	9.73
9.	College of Agricultural Engineering	21.41
10.	Agricultural College & Research Institute, Madurai	66.56
11	CARDS, Madurai	4.35
12.	Agricultural Research Stations & Centres	148.80
13.	University Research Schemes	87.62
14.	Krishi Vigyan Kendra, Pondicherry	9.41
15	ICAR Schemes including Development Grant	218.39
16.	Government of India, Research Schemes	17.09
17.	Outside Agencies Research Schemes	17.19
18.	Veterinary College, Madras	134.29
19.	Veterinary Research Stations, Centres and Schemes	87.21
20	Capital Works (Veterinary)	8.73
21.	Fisheries College, Tuticorin	17.99
22.	Capital Works (Fisheries)	3.92
23.	TNAU Employees Pension Fund	15.00
24.	Loans and Advances and Deposit transaction etc.	63.99
25.	HBA Account	15.00
26.	Hill Area Development Programme	0.68
		1212.91
	Closing balance as on 31.3.84	132.52
	Total	1345.43

The finance Committee considered the proposal for Revised Estimate 1983-84 of Tamil Nadu Agricultural University and recommended the Estimate to the Board of Management. The annual audited Accounts for the year 1982-83 has already been finalised and will be placed before the Board of Management. As the Audit of accounts for 1983-84 has not been completed the accounts for 1983-84, the above furnished figures, are subject to audit.

Contributions of Outside Ageneics

The following outside Agencies came forward to contribute funds to carry out the research projects as indicated against each.

Name of Agency	Name of Research Project
1. PL. 480, USA	Research project on Fate and Efficiency of urea-Based Fertilizers in India
2. Agrl. Refinance and Development Corporation - Bombay	Project on Expost Evaluation of Dug-well investment in Hard Rock areas in Tamil Nadu.
3. NABARD - Bombay	Project for the study into small farmers reach down in Tamil Nadu.
4. Ford Foundation.	Project on the changing structure of Rural employment and factor market in Tamil Nadu.
	Study on the Role of women in Rural Development.
5. UNESCO	Studies on the influence of ecological disturbance on water quality and the impact along Amaravathi River system
6. Coffee Board, Bangalore	Scheme for strengthening coffee teaching and training for the under graduate and Post graduate degree courses in Horticulture.

Scholarship

The scholarship offered by the following organizations were accepted.

Name of Donar	Amount	Purpose
1. M/s. Gujarat Agro-Industries Corporation Limited, Ahmedabad	Rs. 15,000/-	Scholarship to M. Sc. (Ag.) Student in Agrl. Entomology
2. M/s. Madras Fertilizers Limited, Madras	Rs. 9,433 -	do In Agronomy

3.	M/s. Monsanto Chemicals of India Limited, Bombay	Rs. 12,500/- each	do In Agronomy at Coimbatore and Madurai.
4.	M/s. Hindustan Lever Limited.	Rs. 11,600/-	do In Agronomy
5.	M/s. SPIC Ltd., Madras	Rs. 12,500/- each	do in Agronomy at Coimbatore (Two)
6.	M/s SPIC Ltd., Tuticorin	Rs. 11,600/- each	do In Agronomy at Madurai (Two)
7	M/s. Coromandal Indaq Products Ltd., Madras.	Rs. 11,600/- each	do In Agri Entomology at Coimbatore, Madurai.
8.	M/s. Sandoz (India) Ltd., Coimbatore.	Rs. 11 600/-	do In Agrl. Entomology
9.	M/s. Potash Res. Institute, of India, New Delhi	Rs. 11,600/-	do in Soil Science and Agri. Chemistry
10.	M/s. Bharat Pulversing Mills (P) Ltd., Madras	Rs. 11,600/-	do in Agrl. Entomology
11.	M/s Velsicol Chemical, Corporation, Chicago, Illinois, USA	Rs. 12,500/-	do in Agronomy.
12.	M/s. Pond's (India) Ltd., Madras.	Rs. 12,500/-	do in M. Sc. (Hort.)
13.	Madras Race Club, Madras	Rs. 11,600/- each	do M.V.Sc. Students (Two)
14.	M/s. Alkali & Chemical Corporation of India	Rs. 11, 600/-	do in Agrl. Entomology

Prizes and Medals

The following prizes and medals were instituted during 1983-84.

	Name of the Prize/Medal	Purpose	Amount	Donated by
1.	Premier Irrigation Gold Medal	For the best Student in B. Sc. (H) Veg. Crops.	5000/-	Premier Irrigation Equipment Limited, No. 72, Sengupta Street, Ramnagar, Coimbatore-641 009.
2.	Dean, Dr. C. A. Muthukrishnan Medal	For the best B. Sc. (H) Student in all Hortl. Subjects	5000/-	Convenor, Edowment Committee, Faculty of Horticulture, T. N. A. U., Coimbatore-3.

3	South Indian Hortl. Asson Medal	Best student in B.Sc. (H) securing highest OGPA over the four years of studies.	5000/-	R. Rajasekar, Planter, Pattiveeranpatti-624 211.
4.	Indo American Hybrid Seed Medal	Best student in B. Sc. (H) who secures the highest marks in Floriculture	5000/-	M/s. Indo American Hybrid Seeds, 42/1, IInd 'A' main 17th cross, K. R. Road, Banaskhankari II stage, Bangalore 560 070.
5.	Silver Jubilee Endowment Prize, HRL, Periyakulam	Best student in B. Sc (H) who secures the highest marks in three crop production courses in Hort.	5000/-	Instituted by the T. N. A. U. during the Silver Jubilee celebrations of HRS, Periyakulam.

Grants in aid by the TNAU

The following matching grants were sanctioned during 1983-84 to outside agencies.

1)	Matching grant for 1980-81, Tamil Nadu Agri. University Ladies Club, Coimbatore-3.	Rs. 710/-
2)	Secretary, MASU Grant-in Aid, Coimbatore	Rs. 7,000/-
3)	Tamil Nadu Agri. University, Staff Club for the year 1982	Rs. 4,974/-
4)	Maching grant-Staff Club, Agri College and Research Institute, Madurai.	Rs. 1,128/-

University Budget Estimate for 1984-85

Annual Financial Estimate of Tamil Nadu Agricultural University has been approved by the Finance Committee/ Board of Management for a gross appropriation of Rs. 1702.81 lakhs (including ICAR, Government of India, other-agencies schemes and loans and advances and deposit transaction)

A sum of Rs. 964.23 lakhs is expected as grant from the state government to the University for the year 1984-85 for implementing various education research programmes and also extension activities. Grants from ICAR will be about Rs. 448.95 lakhs includidg ICAR Development grant and implementing NARP. Grant of Rs. 23.54 lakhs is expected from Government of India and Rs. 19.41 lakhs from other agencies. The university receipts will be Rs. 146.00 lakhs approximately.

Audit

The Audit certificates for 1981-82 have been sent to the ICAR and Goverment of India for almost all the schemes sponsored by them. The audit of General Fund Accounts of the University upto 1982-83 have been completed. The actual result of the audit is satisfactory.

3. EDUCATION

AGRICULTURAL COLLEGE AND RESEARCH INSTITUTE, COIMBATORE

Teaching

Dr. K R Ramaswamy continued to hold the post of Dean (Agri.). The Agricultural College and Research Institute, Coimbatore continued to offer B.Sc (Ag.) Programme under the trimester system.

i) Admission

The college reopened on 11.7.83 for II and III year B Sc (Ag.) students and on 22.8.83 for final year B Sc (Ag.) students. The first year B. Sc (Ag.) classes commenced on 1.12.83.

The number of students in the first, second, third and final year B Sc. (Ag.) were 143, 132, 110 and 101 respectively.

ii) Educational Tours

The final year B Sc. (Ag.) students went on an All India Tour between from 12.2.84 and 4.3.84. They visited Various Universities & Institutions at Madras, Hyderabad, New Delhi, Dhhradun, Hissar and Bangalore

iii) Scholorships

The details of Scholarships awarded during 1983 - 84 are given below .

	Name of the Scholarship	Total no. of recipients	Amount Rs.
1.	Backward Class	109	97,273
2.	Backward Class Loan Scholarship	2	1,000
3	Scheduled Class Scholarship	87	6,385
4.	Scheduled Class Loan Scholarship	72	39,800
5	Gandhi Memorial	2	1,000
6.	Adhoc Merit Grant to Scheduled Castes	15	4,500
7.	National Merit	18	24,690
8.	National Loan	8	5,523
9.	GOI Merit Cum Means	39	6,125
10.	National Foundation for Teachers' Welfare	4	1,500
11.	Ceylon Repatriates	2	2,000
12.	Pondicherry State	13	11,885

13	Alkali	1	4,000
14.	Indofil	1	1,200
15.	Bayer	1	2,786
16.	Bank of Baroda	1	900
17.	Andhaman Nicobar	4	7,010
18.	ASPEE	1	1,800
19.	A. D Council	2	63,823
20.	Nagaland	1	2,965
21.	General Cultural Scholarship	2	3,728
22.	Hindustan Lever	1	11,600
23.	SPIC	1	25,000
24.	Coromandel	1	11,600
25.	Postmatic HRDC	3	7,200
26.	E. I. D. Parry & Co	3	2,400
27.	M S. Sandoz	1	11,600
28.	Madras Fertilizers	1	8,727
29.	I C. A. R	82	6,16,614
30.	TNAU Merit	88	55,000
31.	Ford Foundation	17	76,000
32.	Assistantship	3	16,400

iv) Students' Hostel

Management

Dr. P. K. Aiyasamy, Professor and Head, Department of Agricultural Economics continued as Warden upto 31 1.84 and Dr. SP. Palaniappan, Professor of Agronomy took charge of the position from 1.2.84. The following staff members continued as Deputy Wardens during the year and were incharge of the portfolio noted as against each :

1) Dr. R Arumugham, Associate Professor of Horticulture, Deputy Warden (Stores upto 31.5.84 and from 1.6.84 as Accounts)

2) Thiru N. Kempuchetty, Assistant Professor of Agronomy, Deputy Warden (Canteen upto 31.5.84 and Mess from 1.6.84).

The following staff members were appointed as Deputy Wardens in the place of Dr. K. K Mathan, Associate Professor of Soil Science and Thiru M. Swamiappan, Associate Professor of Agricultural Entomology who were relieved at the end of their tenure on 31.5.84.

1) Dr. I. Irulappan, Associate Professor of Horticulture, Deputy Warden (Stores)

2) Dr. S. Jeyachandran, Associat Professor of Agricultural Microbiology, Deputy Warden (Canteen).

Tmt. Jacquiline Selvaraj, Associate Professor of Seed Technology continued as Deputy Warden (Womens' Hostel)

during the year 1983 - 84. Thiru S. Shanmugasundaram, Assistant Accounts Officer was relieved from the post of Assistant Accounts Officer (Hostel) and Thiru C. Rajagopal took charge of the post on 18.5.83. The Warden and the Deputy Wardens worked as a team attending to the Welfare of inmates of the Hostels ably.

Hostel Accommodation

There was a total strength of 874 students accommodated in various hostels which included 226 girl students.

The students are accommodated in the hostels as detailed below.

Year	Hostel	No. of rooms	No. of Inmates
1. I B.Sc. (Ag.) & (Hort.)	Old Hostel	26	112
2. II -do-	PPC Hostel	40	125
3. III -do-	Tamilagam	39	79
4. IV -do-	-do-	51	75
5. Dip. in Sericulture	PPC Hostel	13	34
6. I M.Sc. (Ag.)	P. G. Hostel	78	83
7. II M.Sc. (Ag.) & Ph.D	-do-	115	110
Women Students			
1. III & IV B.Sc. (Ag.)	New Hostel	92	30
2. P-1 Bungalow		11	
3. P-2		12	
4. P-3		12	
5. P 26		12	226
6. P-27		11	
7. P-29		12	

The University Medical Officers provided medical services to the inmates of the hostels. In addition to the Male Medical Officer, a Lady Medical Officer also was appointed during the year for attending to the girl students.

Students' Mess

Totally seven messes were functioning as in previous years. The provisions and groceries were purchased from Tamil Nadu Agricultural University Employees' Co-operative Stores, and Regional Distribution Centre, Coimbatore. The controlled commodities like sugar, maida, rava and sooji were purchased from the Civil Supplies Corporation, Coimbatore. Rice and oil were purchased from local traders. Milk was purchased from the Coimbatore Milk Producers' Union for the entire period and milk for the Womens' Hostel was supplied by the Department of Animal Husbandry, Tamil Nadu Agricultural University. In all the messes, only Indane Gas was used as fuel, considerably reducing the expenditure on fuel.

The Students' Representatatives, nominated by the Warden in consultation with the students, took care of running the messes efficiently. Regular Mess Representatives meetings were conducted to discuss the points for smooth management of messes

Students' Canteen

The students' canteen catered to the needs of students' requirements of stationery and cosmetics items besides coffee, tea and light snacks. The extension counter of the students' canteen at women's hostel, served the needs of the girl students. The student representatives met and discussed to provide facilities for the improvement of the canteen. The total annual transactions of the students canteen was Rs. 1.88 lakhs.

As an entertainment for the students totally 33 films were screened in the Anna Auditorium during the year.

In the year under report a new committee called the Students' Welfare Committee, common to both Agriculture and Engineering hostels was constituted to look after the financial management of the hostel and welfare of the students. Dean (Agriculture) was the Chairman of the Committee during the year as per the approval of the Board of Management Administrative Committee. During the year, the Students' Welfare Committee met twice to discuss the functioning of the hostels.

Students' Club Activities

Muthamil Vizha was celebrated from 7th to 8th May, 1983 at Anna Auditorium. Tmt. Saraswathi Venkataraman inaugurated by lighting the 'Muthamil Sudar'. Prof R. K Sivanappan, Dean College of Agrl. Engineering presided and Thiru Kumari Anandan, famous orator gave a special lecture on 7th May.

The Annual Day sports of TNAU main campus was held on 16th May, 1983. Dr. M A M. Ramaswamy, Vice-President, International Hockey Federation was the Chief Guest and Thiru A. Venkataraman, I. A. S., Vice-Chancellor, TNAU presided. Thiru R. Gnana sekaran, Asian Games Gold Medalist and Arjuna Award recipient distributed the prizes. Dr K. R. Ramaswamy, Dean Agri.) welcomed the gathering.

Students' Club Day was celebrated on 21st May at Anna Auditorium. Thiru V.T. Thurairaj, I.A S., Director of Agriculture was the Chief Guest and distributed the prizes. Thiru A. Venkataraman, I A S., Vice-Chancellor presided

A well equipped dark room for developing and printing photos for Arts and Photographic Society was opened on 20th May in the old hostel by the Vice-Chancellor, Thiru A. Venkataraman. College coloures for the out-standing sports men were presented by the Vice-Chancellor during Hostel Day, on -th June 1983.

Office bearers of the Students' Club for the year 1983 84 were selected. Mr S. M. Manikumar IV B Sc. (Ag.) and B. Devanathan IV B.Sc. (Ag.) were selected as Club Secretary and Games Secretary respectively.

Sports and Games

TNAU main campus Cricket team took part in C.D.C.A. League Tournaments and won. The Volley-ball team

participated in State Level Inter-collegiate Volly-ball tournament conducted by P.S.G. Arts College on 21.9.83. Dr. K.R. Ramaswamy, Dean (Agri.) inaugurated South Arcot V/S Coimbatore Inter District, School Cricket tournament held at main campus grounds on 24th and 25th September, 1983. Twentyfive Students donated 300 ml each of their blood to the blood bank of Coimbatore Medical College on the eve of Gandhi Jayanthi day on 2nd October, 1983.

TNAU Foot ball team participated in inter-university tonrnaments held at Calicut on 17.10.83. The inaugural function of students' club activities and welcome party to the new Vice Chancellor were hosted on 18th October 1983. Dr. V. Rajagopalan, Vice-Chancellor, Tamil Nadu Agricultural University was the Chief Guest and Manam Chera Chandrahasan delivered a special address. The hockey team participated in Coimbatore District, Super League Hockey Tournament held at Stanes Higher Secondary School Coimbatore on 29th and 30th October, 1983.

Tamil Nadu Agricultural University Cricket team participated in Madras University (South Zone) tournaments conducted by the Madras University on 2nd, 3rd, Jan., 84. Mr. V. Rajkumar, B.E. (Ag.) has participated in 10 k.m. cycle race conducted by city club on 4.1.84. A staff V S Students table tennis match was arranged on 25.1.84 in the Indoor games Hall

The Third I.C.A.R. Inter-zonal athletics meet was conducted on 28th January, 1984. Dr. V. Rajagopalan, Vice-Chancellor, TNAU was the Chief Guest and distributed the prizes.

The Kalaimani Memorial Foot-ball tournaments was conducted from 2.1.84 to 4.1.84 and the PSG Arts College and Govt. Arts College emerged as Winners and runners respectively. Dr. V. Rajagopalan, Vice-Chancellor, TNAU distributed the rolling Shield. Students participated in state level inter-collegiate cultural programme spectra'84 conducted by PSG College of Technology on 18th and 19th February, 84

TNAU Basket ball team participated in inter university tournaments held at Guntur on 24.11.83. TNAU Hockey team participated in inter university tournament held at Madurai Kamaraj University, and TNAU beat J.N.V. Hyderabad by 5-2 goals but lost to M.K. University.

Students of main campus participated in elocution and oratorical contest conducted by Gandhi Peace Foundation on 2.10.83 and won the consolation prize. Mr. Iraiambu V B.Sc. (Ag.) won the second prize in TNAU contest conducted by the Arya Visya Youth Club on 16.10.84 and the first prize in the contest of Fine Arts Society, Coimbatore on 17.9.83.

TNAU inter-collegiate debating competition on Co-operation was conducted on 14.11.83. Mr. Albert Xavier, Agricultural College and Research Institute, Madurai won the Ist place and the team Championship went to Agricultural College and Research Institute, Madurai.

Under the auspices of Hiking Society a cycle tour was arranged to Kallar on 15.12.83, in which 50 students actively participated. The inaugural of the flood-lit basket ball court was made

on 6.1.84 and Dr. V. Rajagopalan Vice Chancellor, Tamil Nadu Agricultural University switched on the hallogin lamps and distributed the momentoes to participants in the exhibition match between TNAU main campus team and Y.M.C.A team Coimbatore. Dr K. R. Ramaswamy, Dean (Agri) presided.

Republic Day was celebrated on 26.1.84 and Dr S. Jayaraj, Registrar, Tamil Nadu Agricultural University hoisted the National flag and distributed the sweets to the children.

Students of the campus participated in cultural competitions conducted by PSG College of Arts and Science ces, '84 and also in Inter-collegiate cultural competitions conducted by G.C.T. Coimbatore.

National Cadet Corps

Zeal and enthusiasm marked the beginning of N.C.C. activities which commenced in April '83 under the guidance and leadership of Lt. Dr. P. Rajasekaran.

CSVO. R. Vijayaraghavan took active part in enrolling the cadets. He was adjudged to be the best among the 30 cadets who attended "Basic Leadership Course" held at Gurgoan, Punjab.

Sixteen Cadets Company attended Annual Training Camp held at Government Polytechnic, Coimbatore from 20th - 31st January, 1984. A. Karnan, II B.E.(Ag.) was adjudged and won the trophy for the "Best shot" during the Camp. The Cadets of the company were presented for "C" and "B" Certificate exams during March, 1984 and results are awaited. Besides regular NCC classes in the field of Bayonet fighting, Rifle shooting, Field craft, Camouflage and Concealment, Map reading, the cadets had the previlage of taking practical training at hill traces of Siruvani Valleys in Kerala.

On the occasion of Republic Day, the cadets took active part in the flag hoisting ceremony attended by the Registrar, Tamil Nadu Agricultural University.

National Service Scheme

Fifty volunteers were recruited during the year. Three units functioned at Coimbatore campus with one for 100 girls and one unit each in Madurai and Madras Campuses. The volunteers involved themselves in activities like rat eradication campaign in adopted villages, parthenium weed control, afforestation schemes and also in promoting kitchen gardening in the urban areas by distributing vegetable seeds. Volunteers from Madras Veterinary College undertook activities like rinder pest vaccination, food and mouth vaccination and also in animal health service.

Forty volunteers of the University participated in a 10 days development camp held at Coonoor during the month of September and October, 1983. Two volunteers participeted in the National Service Scheme youth exchange programme held at Madras in the post centenary celebrations of the University of Madras.

AGRICULTURAL COLLEGE & RESEARCH INSTITUTE, MADURAI

Dr. K. K. Krishnamoorthy, continued to be the Dean of the Institute during the period under report.

Admission

The number of students on roll was as follows :

1.	I B.Sc. (Ag.)	:	80
2.	II B Sc. (Ag.)	:	118
3.	III B.Sc. (Ag.)	:	62
4	IV B.Sc. (Ag.)	:	83
5.	I B.Sc. (H Sc.)	:	19
6.	II B.Sc. (H.Sc.)	:	19
7.	III B.Sc. (H.Sc.)	:	10
8.	I M.Sc. (Ag.)	:	63
9	II M.Sc. (Ag)	:	64
	Grand Total	:	518

Educational Tours

The Third Year B Sc. (Ag.) students were taken on educational tours to Agricultural Experiment Stations at Vedasendur, Aliyarnagar, Coimbatore, Mettupalayam, Ooty, Bhavanisagar, Vridhachalam, Aduthurai, Trichy and Pudukkottai from 30.1.84 to 5.2.84.

The III B.Sc. (H.Sc.) students were taken on educational tour to Tamil Nadu Agricultural University, Coimbatore. They visited various faculties and other places from 29.1.84 to 1.2.84.

The IV B Sc. (Ag.) students were taken on an All India tour. They visited various Agricultural Universities and faculties and Research Centres in India from 10 2 84 to 1 3 84. In general, the tour was successful and informative.

Details of Scholarship

Details of Scholarships for the year 1983 - 84

Details	U. G.	P. G.	Total
1. Adi Dravidar Welfare Scholarship B.Sc. (Ag.)	63	1	64
-do- B.Sc, (H.Sc.)	6	—	5
2. Backward Classes Scholarship B Sc (Ag.)	86		86
-do- B.Sc. (H.Sc.)	10		10
3 D.N.T. Scholarship B Sc (Ag.)	2		2
-do- B.Sc. (H.Sc.)	1		1
4. ICAR Jr. Fellowship	—	22	22
5. ICAR Jr. fellowship under HRD programme	—	1	1
6. Alkalichemical Corporation of India Ltd. Scholarship	--	1	1
7. Coromandal Indag product Ltd. Scholarship	—	1	1
8. Madras Fertilizers Ltd. Scholarship	—	1	1
9. ICAR under Human Resources Development Scholarship	2	—	2
10. Arunachal Pradesh Scholarship	—	1	1
11. Ford Foundation Fellowship	—	2	2

12.	Physically hadicapped Scholarship	2	—	2
13.	Farmers' committee fund scholarship	2		2
14.	Adhoc Merit Grant Scholarship	10	—	10
15.	National Merit Scholarship	14	—	14
16	ICAR Merit Scholarship	23	—	23
17.	S.C loan Scholarship	55		55
18.	Exservicemen scholarship	3	—	3
19.	National loan scholarship	1	—	1
20.	National foundation for Teachers' Welfare Scholarship	2	—	2
21.	Arunachalam shastiabtha poorthy scholarship	1	—	1
22.	Mon Santo Chemicals Ltd. Scholarship	—	—	1
23.	Agrimerit Scholarship	22	25	47
24.	National loan scholarship	1	—	1
	Total	305	56	361

National Service Scheme

The National Service Scheme has been actively functioning in this Institute, since 1975.

Dr K. K. Krishnamoorthy, Dean, Agricultural College and Research Institute, Madurai continued to be the Chairman of the National Service Scheme. Thiru L.R. Rajasekaran, Assistant Professor, Department of Horticulture continued to act as Programme Officer till 31.1.1984. Thiru S. D. Sundar Singh, Asst Professor, Department of Agronomy took over charge as National Service Scheme Programme Officer from 1.2.1984.

At the first instance, 73 students were recruited to National Service Scheme snd subsequently 27 students and thus, the total strength of the National Service Scheme unit was 100.

During the year, regular activities like afforestation inside the campus premises, tree pruning, rat eradication campaign, cleaning the roads and premises of the temple were attended to. One Blood Donation campaign was organised and about 5 students donated their blood. Trees on both sides of the road were lime washed to prevent termite attack. Adult education and night school were also organised at the nearby Malayalathanpatti village. The volunteers also actively participated in traffic regulations in the Madurai city.

A special camp was conducted at Thindiyur village between 17th and 23rd June, 1983 for services like planting tamarind, kapok, neem etc., renovation of common thrashing yard and link road to village. Besides, a one day camp on Animal Husbandry, General Medicine, Eye-camp, Nutrition etc. was also organized.

National Cadet Corps

Forty five cadets were enrolled from second, third and final B. Sc. (Ag.)

classes. The cadets were given training in Foot drill, Arms drill, Weapon training etc.

Eleven cadets from this college appeared for 'B' certificate examination aad a cent per cent result was achieved Cadet Under Officer S. Manickavasagam secured A' grade.

Students' Club

The office bearers of the Students Club for the year 1983 - 84 were elected on 14.10 83 Thiru N. K. Prabakar, IV B.Sc. (Ag.) student was elected as the Club Secretary and Thiru Malik Mohammed Rafi IV B. Sc. (Ag.) class as the Games Secretary Dr. K.K. Krishnamoorthy, Dean continued as the president and Dr. A Rajamannar, Associate Professor continued as Vice President of the Club.

The inauguration function of the Students' Club activities for 1983 - 84 was held on 29.11.83. Dr V Rajagopalan, Vice-Chancellor, Tamil Nadu Agricultural University delivered the inaugural address.

The 'Orientation Day' for the freshers was held on 6.12.83. All the staff members and the office bearers of the Students' Club were introduced to the freshers. The entertainment programmes by the freshers, senior students and the staff members during this occasion were much appreciated.

Sports events were conducted for children, students and for staff members on the Republic Day and prizes were awarded to the winners.

Dramatic Society

Thiru R. Gajendrapandian was elected as secretary of this society. The society was inaugurated on 8 12 83

Thiru Pasupathy, Post graduate student won the first prize in the 'Navarasa' competition in the programme conducted by the Mahatma Montisouri's school.

In the programme organised by the Medical College, Madurai the college came first in the 'Cine guesses' competition and second in the 'Skit' competition.

Thiru Venkatachalapathy, IV B Sc (Ag.) student won the second prize in the dance competition conducted by the Rotaract Club, Madurai west, got the first prize in the competition held by Rotaract club, at Hotel Tamil Nadu and second in the dance competition organized by Madurai Medical College.

Debating Society

Thiru M Selvanayagam, IV B. Sc. (Ag.) class was elected as the secretary for the Debating Society. The inaugural function was held on 5.12.83.

Thiru M. Selvanayagam, IV B. Sc. (Ag.) student won first prize in the poetry competition held at Madurai Medical College.

Thiru Albert Saviour, IV B.Sc. (Ag.) student came first in the Elocution competition conducted by Tamil Nadu Agricultural University and was selected for the All India competition on "Co-Operative Movement".

The College magazine 'Triumph' for the year 1982 - 83 was released during the Debating Society inauguration function on 5.12.83

Archeological Society, Agro Horti Society, Planning Forum, Photographic Society, Volunteer Corps, Music and Archestra Society functioned well this year under the able guidance of the respective staff advisers

Sports and Games

In Hockey Thiruvalargal K Rajan IV B. Sc (Ag), S. Kumar IV B. Sc (Ag), S Avyappan IV B Sc (Ag) P Anandan III B. Sc (Ag.) and K. Nepolean B. Sc (Ag) represented the Tamil Nadu Agricultural University in the Inter University (South Zone) Tournament held at Madurai Thiruvalargal K. Rajan, P. Pandian represented the Tamil Nadu Agricultural University Foot ball Team in the Inter University Tournament held at Calicut. Thiru C. Srinivasan Thiru Mohamed Amanullah and K Rajan of IV B. Sc. (Ag.) represented the University Team in the Inter University Tournament in Cricket held at Madras and Thiru P. Pandian and V. Rajarajan IV B. Sc. (Ag. represented the University in the Inter University Basket ball Tournament held at Annamalai University.

The cricket and volley ball Teams entered the Madurai District Association league tournements.

Annual Cross Country Race

The cross country race around the 'Yanamalai' attracted 23 participants this year.

Sports Day

The XIX Annual Sports Meet was conducted at the College stadium on 11th May 1984. Dr. K. K. Krishnamoorthy, Dean, Agrl. College and Res. Instt., Madurai took the salute and declared the Sports Meet Open. Thiru K. T S Gopalakrishnan I. P. S., Superintendent of Police, Madurai presided and Tmt. Maithili Gopalakrishnan distributed prizes to the winners. Thiru K. Rajan IV B.Sc (Ag.) won the individual championship for men and Miss Mascarenhas Liset, I B. Sc (Ag.) claimed the individual championship for women.

FACULTY OF HORTICULTURE

Dr S Muthuswami assumed charge as the Dean of this faculty on 1. 4. 83.

The faculty offered B. Sc. (Hort.) Degree Programmes besides courses in horticulture for B. Sc. (Ag.) and B. E. (Ag.) students. The faculty continued to offer Post - graduate courses for M. Sc (Ag.) and Ph. D programmes.

Admission

The College was reopened on 11. 7. 1983 for the second year and third year and on 22. 8 1983 for the final year B.Sc. (Hort.) students

A total of 43 (25 + 18) students were admitted to first B.Sc. (Hort.) and the classes commenced on 1. 12. 1983. There were 51 students in II year, 31 students in the III year and 33 in Final B. Sc. (Hort.).

Educational Tour

The final B. Sc. (Hort.) students were taken on a study tour to Coonoor

and Ooty for the study of ornamental gardening on 22. 5. 1983.

They visited Oddanchatram, Dindigul and Vellodu on 12. 10. 1983 for study of vegetable crops.

The Final B. Sc (Hort.) students underwent Farm Experience Programme From 22. 11. 1983 to 21. 12. 1983 in different villages of Salem District. They were on tour from 26. 1. 1984 to 9. 2. 1984 to Yercaud and Thadiyankudisai for practical training in coffee cultivation and they were taken on tour for 22 days from 12. 2 1984 to 4. 3. 1984 on All India Tour Programme to study horticultural practices under different agro climatic conditions

The III B. Sc. (Hort.) students were on tour for 8 days from 23.6.1983 to 24. 6. 1983 to Veppankulam, Vridhachalam and Nagarcoil for the study of plantation crops. They were taken on a short tour for 4 days from 29. 7. 1983 to 1.8.1983 to Periyakulam, Thadiyankudisai and Kodaikanal for the study of fruit crops.

The II B. Sc. (Hort.) students were taken on tour to Kallar and Burliar Fruit Stations and Pomological Station, Coonoor on 1. 9. 83 for the study of the botany of fruit crops.

Details of Scholarship

	Number
Backward Class Welfare Scholarship	47
Adi Dravidar Welfare Scholarship	30
S. C. Loan	23
ICAR Merit Cum Means Scholarship	9
Government of India Pondicherry Scholarship	2
Ford Foundation Fellowship	4
Adhoc Merit Scholarship	6
Research Assistantship	1
TNAU Merit Scholarship (UG)	10
TNAU Merit Scholarship (PG)	4
ICAR Junior Research Fellowship	6
ICAR Senior Research Fellowship	2
Pond's India Fellowship	1
National Scholarship	1
National Loan	[illegible]

FACULTY OF AGRICULTURAL ENGINEERING

Admission

Seventy eight students were admitted to I B. E. (Ag.) course. The first trimester for the I B.E.(Ag.) commenced on 1.12.1983 and for the II, III, IV and V B. E. (Ag.), courses commenced on 10 11.1983, 5.12 1983, 4.1.1983 and 7 9 1983 with strength of 78, 80, 48 46 respectively.

Examination

The sixth and seventh supplementary examinations were conducted during September, 1983 and March, 1984 respectively. Regular tests and examinations were conducted as per the regulations of the trimester system of teaching.

Practical Training

The IV B E.(Ag.) students of five year stream were on practical training from 10.6.83 to 2.7.83 in the following organisations.

i. M/s. PSG Industrial Institute, Coimbatore
ii. Government Tractor Workshop, Coimbatore
iii. Soil Conservation, Ooty and Mettupalayam
iv Assistant Executive Engineer (SCS), Dharmapuri.
v. Assistant Executive Engineer, Tirupur.

The III B.E. (Ag.) students of four year stream were on practical training from 12.12.83 to 3.1.84 in the following organisations.

i. M/s. PSG Industrial Institute, Coimbatore.
ii M/s LCT Industries, Coimbatore.
iii Soil Conservation Ooty and Mettupalayam.
iv Soil Conservation, Coimbatore
v. Assistant Executive Engineer, Tiruppur
vi. Command Area Development Programme, Gobi.
vii Milk Union and Government Tractor Workshop, Coimbatore

Educational Tour

The final B. E. (Ag.) students were on All India Study Tour from 1.3.84 to 21.3.84 and they visited various Industries and Institutions at Bangalore, Bombay, Goa and Hyderabad.

The IV B. E.(Ag.) Students were on a State level tour from 22.4.83 to 30.4.83 and visited several incustries and institutions.

The III B.E. (Ag.) (four year stream) students were on tour from 24.10.83 to 31.10.83 and they visited different Industries/Institutions in Tamil Nadu.

Scholarships

The following scholarships were availed by the students during 1983-84

Details of Scholarship	Number
ICAR Merit Scholarship	18
A.P. Government Scholarship	5
National Loan Scholarship	2
NCERT Scholarship	1
S.C. Loan Scholarship	24
Teachers' Welfare Scholarship	2
B.C. Scholarship	61
GOI Physically Handicapped Scholarship	1
S.C. Scholarship	41
Adhoc Merit Grant	7
Farmers' Welfare Scholarship	2
TNAU Merit Scholarship	21
National Merit Scholarship	5

National Service Scheme

A total number of 100 volunteers of NSS engaged themselves in the following activities.

- tree planting at Muthipalayam village in collaboration with Indian Overseas Bank, Thondamuthur,
- parthenium eradication and cleaning in and around main campus of the University,
- arranging mini Exhibition-cum-Demonstration of Agrl. Implements at Natha Gounden Pudur,

- fifteen volunteers attended special South Zone Inter Eco-development camp at Coonoor for 10 days and
- desilting work near Black bridge under the guidance of Engineers of Agrl. Engineering Department.

FACULTY OF FISHERIES SCIENCE

Admission

Twenty students were admitted into the first year B. F. Sc. programme and 5 students were admitted into the first year M.F.Sc. programme at the Fisheries College, Tuticorin during the year 1983-84. The first trimester for the first year B. F. Sc. programme started on 1.12.1984 and M.F.Sc. programme on 16.11.1984.

Examination

Apart from regular tests and examinations under the trimester system, a supplementary examination was conducted during May-June 1983 for the benefit of the students having a large number of arrears in their courses.

Educational Tours

The fourth year B.F.Sc. students went on All India Tour for 20 days to Visakapatinam, Calcutta, Kashmir, Bombay, Goa, Mangalore and Cochin.

The third year B.F.Sc. students under took a tour for 12 days to important fishery establishments at Madras, Coimbatore, Uthagamandalam and Bhavanisagar.

Scholarships

The details of scholarships enjoyed by the students during the year 1983 84 are given below :

Name of the scholarship	No. of students	Rs.
Backward Class Scholarship	21	19,159
Scheduled Caste Scholarship	13	31,708
Scheduled Caste Loan Scholarship	9	7,610
National Loan Scholarship	3	2,940
ICAR Merit Scholarship	6	6,125

Students Hostel

Dr. G. Jagatheesan, Dean in-charge, Fisheries College, Tuticorin was the Warden and Dr. N Ramanathan, Assistant Professor functioned as Deputy Warden. There were 79 students residing in the hostel, including 8 M.F.Sc. students.

Entertainment for Students

Radio and T.V. were available at the hostel. Indoor games and recreational facilities were also made available.

Students' Club

The activities of the Students' Club for the year 1983-84 was formally inaugurated on 16.1.1984 by Dr. V. Rajagopalan, Vice-Chancellor. The College team won the Greena Memorial rolling shield and the Indian Medical Association shield. An inter-collegiate quiz competition FIZZOREE-84 was conducted under the auspices of the Litrary wing. Thiru R. Jeyaraman, IV B.F.Sc. student won the second prize in the eassy competition conducted by Tuticorin Fisheries Graduate Alumini of the College of Fisheries, Mangalore.

MADRAS VETERINARY COLLEGE, MADRAS

Admission		B. V. Sc.	M. V. Sc.	Ph. D
No. of students admitted	:	126	18	9

Date of commencement of the Academic year 1983-84 :

Course	Date
I. B. V. Sc.	1. 12. 1983
II. B. V. Sc. / III. B. V. Sc / IV. B. V. Sc / V. B. V. Sc.	16. 2. 1984
M. V. Sc. / Ph. D	10. 10. 1983

Scholarships

Sl. No	Name of Scholarship	No. of recipients	Amount Rupees.
1.	Adi Dravida & Tribal Welfare Scholarship	77	1,67,975
2.	Adi Dravida & Tribal Welfare loan Scholarship	19	17,100
3.	Backward Class Scholarship	94	94,322
4	Backward Class Loan Scholarship	2	1,000
5	Adhoc Merit Grant for Scheduled Caste students	15	4,500
6.	National Merit Scholarship	10	10,530
7	National Loan Scholarship	13	8,312
8.	Ex-servicemen Schohlarship	1	884
9.	ICAR Merit Scholarship	35	48,125
10.	National Foundation for Teachers' Welfare Scholarship	8	4,000
11.	State Scholarship for Children of school teachers	1	750
12.	TNAU Merit Scholarship	12	7,490
13.	TNAU SC/ST Scholarship	7	3-250
14.	Pondicherry State Post-metric Scholarship	3	2,100

15.	Jammu & Kashmir Post-metric Scholarship	3	6,461
16.	Government of India Cultural Scholarship	2	9,240
17.	Megalaya Scholarship	3	10,800
18.	Ford Foundation Scholarship for women students (P. G.)	1	2,567
19.	TNAU Merit scholarship for P. G. Students	12	20,026
20	Bright students Award for Scheduled Caste students		
21.	Merit Cum-Means Award for Scheduled caste students		
22.	Andaman & Niccobar Scholarship	4	4,110
	Total	272	4,[illegible]3,54[illegible]

Students' Hostel

Dr. R. Ramamurthi, Professor and Head, Department of Meats Continued as Warden upto 31. 7. 83 and Dr. V. Ulaganathan, Professor and Head, Department of Animal Genetics took charge of the post of Warden from 1. 8. 83.

The Warden was assisted by three Deputy Wardens. Students' representatives have been elected to assist them in the various activities connected with the functioning of the hostels.

Students' Club Activities

The Madras Veterinary College Students' Association was inaugurated on 6. 1. 1984. The inaugural function of the Tamil Associatian was celebrated on 9.1.1984 and the Litrary Association was inaugurated on 8.3.1984.

Students took part in a variety of intercollegiate activities at Madras and elsewhere. Thiru B. Srikanth of III B. V. Sc., was the outstanding student of the year taking the first prize in the inter-collegiate Oratory competition conducted by the University.

Sports and Games

Dr. P. Mahalingam, Professor and Head, Department of Animal Diseases, Investigation and Control, continued as Sports Secretary for the year 1983 - 84. Thiru S. Benjamin Ratnasingh of Final B. V. Sc. was nominated as students' Sports Secretary.

The college teams in Hockey Football, Cricket, Basket ball, Volley ball Badminton, Tennis and Table Tennis, participated in the I. I. T. Tournaments Loyola, Pertram Tournament, Blue star, Anna Birth Day Trophy and Anna University Tournaments. The performance of our players was praise worthy.

Players of this College participated in the University team selection trials conducted by Tamil Nadu Agricultural University and they were selected to

represent the TNAU in Inter-university tournaments (South Zone) for the year 1983-84 is Hockey, Football, Cricket and Basketball

Thiru D Sundararaj, Physical Director was nominated as the Manager of Tamil Nadu Agricultural University Cricket Team for the year 1983-84 in the inter university cricket tournament held at Madras during the month of December, '83

The Second Annual Madras Veterinary College Sports Festival in Basket ball for the Tamil Nadu Agricultural University Trophy and in Ball Badminton for the Madras Veterinary College Platinum Jubilee Commemoration Trophy were held during February, '84.

National Service Scheme

The student members of the National Service Scheme unit under the leadership of Dr M. Mahadevan Pillai, the Programme Officer, visited the adopted village, Hasthinapuram regularly and carried ont professional extension activities like vaccination of fowls debeaking the fowls, and treatment of animal and fowls, etc.

A special camp at the Livestock *Research Station, Kattupakkam* was conducted for 10 days from 31. 3. 1983 to 9. 4. 1983. Thirty student volunteers, 3 local youths and the Programme Officer attended the Camp and they visited the surrounding villages, Potheri, Konari and Kavanoor. Vaccination of cattle of the farmers with Rinderpest vaccine, pregnancy verification of cattle, deworming of sheep, castration of bulls, vaccination of fowls with Ranikhet vaccine etc, were attended by them. "Shram Dhan" in the form of Road repairs also was carried out. Films about improved scientific livestock keeping were projected in the villages and the Farmers' cooperation was quite encouraging.

Post-Graduate Education in the University

The progress in Post-graduate education in the University is furnished below :

Theses submitted during 1983 - 84

Department	Mater's Degree	Ph. D. Degree
Agronomy	12	1
Plant Breeding and Genetics	2	2
Agricultural Entomology	3	4
Plant Pathology	-	5
Soil Science & Agrl. Chemistry	6	3
Agricultural Economics	1	2
Agricultural Extension	9	2
Seed Technology	1	1

Crop Physiology	1	2
Horticulture	4	4
Sugarcane Production	6	-
Agricultural Microbiology	2	-
Plant Nematology	-	-
Soil & Water Conservation	2	-
Farm Power & Machinary	7	-
Agricultural Marketing Management	4	-
Total	60	26

Students Admitted During 1983 - 84

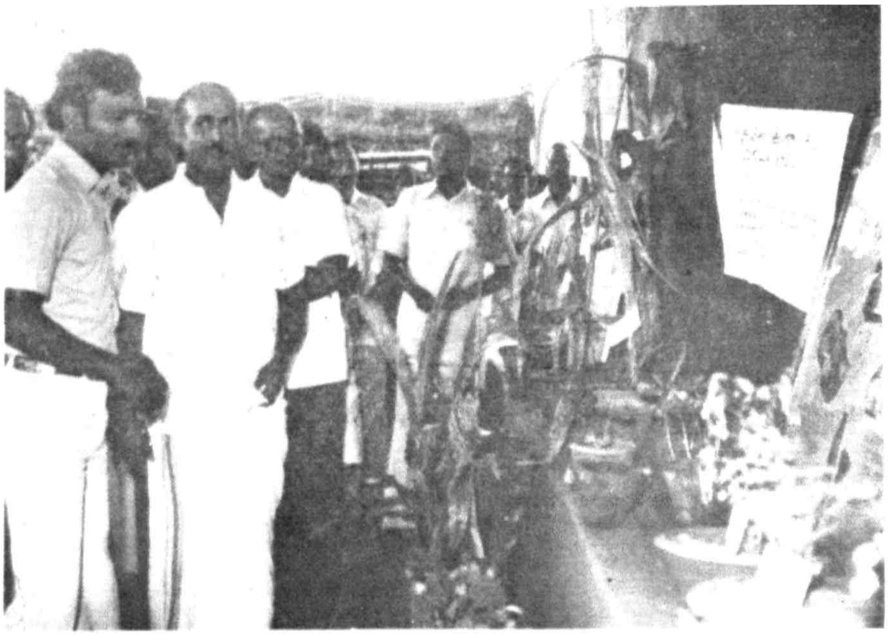
Department	Master's Degree	Ph. D. degree
Agronomy	35	9
Plant Breeding and Genetics	23	7
Agrl. Entomology	13	4
Plant Pathology	9	4
Soil Science & Agrl. Chemistry	14	6
Agrl. Economics	19	3
Agrl. Extension	23	3
Seed Technology	9	2
Plant Nematology	2	-
Agrl. Microbiology	10	2
Crop Physiology	3	3
Sugarcane Production	14	-
Agrl. Marketing Management	6	-
Plant Protection	11	-
Horticulture	14	-
Food Science & Nutrition	5	-
Soil & Water Conservation	3	-
Farm Power & Machinery	2	-
Fisheries Science	5	-
Grant Total	221	48

Post Graduate School of Plant Protection

Teaching

The following short term courses in plant protection were conducted during the period under report

Sl. No.	Name of course	Period	No. attended & Department or Organisation
1.	Pest Surveillance and Assessment of incidence	18 - 23, April, 1983	15 from Pesticide Industry.
2.	Pest Management in Field Crops	2 - 7, May, 1983	21 from Pesticide Industry.
3.	Pest Surveillance	9 - 14, May, 1983	27 from State Department of Agriculture and 2 from State Department of Oilseeds.
4.	Pest Surveillance	30 th May to 4th June, 1983	25 from State Department of Agriculture.
5.	Pest Surveillance	4 - 9, July, 1983	24 from State Department of Agriculture, 2 from State Department of Horticulture and Plantation Crops, and 4 from State Department of Oilseeds.
6.	Control of *Spodoptera litura* with Nuclear Polyhedral virus	8 - 10, Aug, 1983	6 from State Department of Agriculture
7.	Use of green muscaraine fungus for control of rhinoceros beetle.	8 - 10, Aug, 1983	12 from State Department of Oilseeds.
8.	Integrated Pest Management in Cotton	26 - 30, Sep, 1983	5 from SIMA Cotton Development and Research Association.
9	Seed Health	24 - 28, Oct, 1983	5 from State Department of Seed Certification.



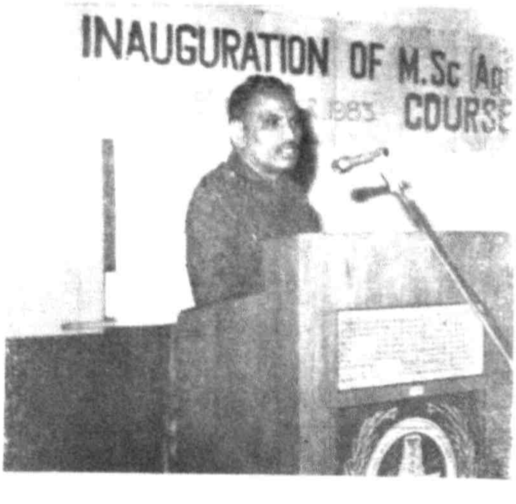
Dr. K. Kalimuthu, Hon'ble Minister for Agriculture and Pro Chancellor at an exhibition at Coimbatore

Thiru A. Venkataraman, Vice-Chancellor declaring open the first floor of K.V.K. building at Coimbatore

The Vice-Chancellor declaring open the housing complex
at the Regional Research Station, Paiyur

Thiru R. M. Veerappan, Hon'ble Minister for Religious Endowments, Tamil Nadu
visiting the Livestock Research and Development Centre, Pudukkottai

Under-graduate students at field work



Thiru U. S. Natarajan, Director of Agriculture inaugurating the M. Sc. (Ag.) course in Plant Protection

Special Lectures Delivered

The following special lectures were delivered by the staff of the P. G school during the year.

Sl. No.	Topic	Date	To whom given
1.	Pest management in crops	18th Apl, 1983	8 Probationary I.A.S officers of Tamil Nadu cadre
2.	Identifying insect pest of ragi and minor millets, their damage and management.	26th Aug, 1983.	25 Extension functionaries of the State Department of Agriculture, Tamil Nadu
3	Pest management in coconut	7th Oct, 1983.	25 Extension functionaries of the State Department of Oil seeds.
4.	Integrated pest management in watershed areas.	15th Dec, 1983.	22 Extension functionaries of the State Department of Agriculture.
5.	Biological control of pests of pulses.	1st Feb, 1984.	25 Extension functionaries of the State Department of Agriculture, Tamil Nadu, Karnataka and Haryana (Participants of the All India Pulses Training programme).
6.	Integrated pest management in cotton - A case study	15th Feb, 1984.	Members of the Zoology Association, Kongunadu Arts and Science College, Coimbatore.
7.	Pests of oilseeds and their management.	25th Feb, 1984	20 Extension functionaries of the State Department of Oilseeds.

UNIVERSITY LIBRARY

During the year 1983-84, 4096 books and 35 new journals were added to the library of which 226 books were received as gratis. The library received 1014 periodicals of which 590 were from foreign countries. Twenty journals were received free of cost for exchange of Madras Agricultural Journal and 109 journals were received as gratis.

The library was visited by 1,26,181 readers. About 12.8 lakhs books and

periodicals were consulted by the readers in the library and about 75000 books were issued on loan for home reading. A total of 8143 issues of periodicals were displayed for use in 1983-84 and about 3800 volumes of periodicals were bound and added to the back volume section.

Arrangements were made in the library to provide inter-library loan facilities among agricultural universities and other technical institutions in India and abroad on reciprocal basis. Xeroxing facility available in the library was effectively made use of. Important research articles published in journals were xeroxed and sent to the Research Stations of the University through the Director of Research (Agri.), Tamil Nadu Agricultural University, Coimbatore. The students were taught on library management and effective use of library by the library staff and 28 classes were conducted in that respect.

The 'Library Committee' of the University met nine times during the year and discussed the various issues of library management.

4. RESEARCH

The major research achievements of the University in the areas of crop improvement, crop management, veterinary and animal sciences, fisheries, agricultural engineering and social sciences are presented below :

RICE

Crop Improvement

MDU 2 Rice : This variety is specifically suited to the 'Cumbam Valley' tract of Madurai district where cold conditions prevail during flowering phase of rice which adversely affect the rice yield. The spikelet sterility was found to be lesser in this variety (23.4 per cent) as compared to IR 20 (44.6 per cent). This variety yielded more than IR 20 by about 15 to 17 per cent.

Crop Management

The yield of paddy was significantly increased by 11.4 per cent over control by compacting the soil by passsing eight times a 400 kg stone roller.

Inoculating one tonne of azolla in rice a week after transplanting and allowing it to multiply for first incorporation three weeks later and second incorporation fifteen days subsequent to it supplies 60 kg N per ha. The yield of Co 43 rice fertilized with 90 kg N, 60 kg P_2O_5 and 60 kg K_2O (5703 kg/ha) was comparable to 30 kg N, 60 kg P_2O_5 and 60 kg K_2O/ha with dual cropping of azolla (5462 kg/ha).

In rice double cropped area the first crop should be cut, leaving 45 cm tall stubbles to be incorporated later in the rice field. Transplanting of the second crop is to be done 15 days later, after the stubbles get decomposed. This practice was found to result in a saving of fertilizers by 50 per cent and the yield obtained was comparable with the yield of rice applied with full level of recommended fertilizer, 120 : 60 : 60 kg NPK/ha.

Crop Protection

Among the popular varieties, Ponmani is resistant to green leaf-hopper while Ponni, Vellai Ponni, IR 20 and IR 50 are moderately resistant.

Through field screening, five highly resistant cultures 6315, 7008, 7009, 7250, 7325, and C 37 to gall midge have been identified at Madurai.

Carbaryl, Chlorpyriphos, Quinalphos and Monocrotophos were found to be very effective against leaf folder.

Chlorpyriphos was very effective followed by Endosulfan for the control of army worm of rice seedlings.

Four fungicides viz. Bavistin (250 g/ha), Hinosan (500 ml/ha), Dithane M 45 (1000g/ha) and Difolatan (725 g/ha) were evaluated in four field experiments for their efficacy in the control of sheath rot disease. The fungicides were sprayed at tillering and boot leaf stage. Crop treated with Bavistin recorded the least disease incidence followed by Dithane M 45. When the yield was considered, all the four fungicides were on par. Difolatan gave the highest cost benefit ratio (1 : 15) followed by Bavistin and Dithane M 45 (1 : 9)

MILLETS

SORGHUM

Crop Management

In respect of ratoon management at Coimbatore it was observed that the summer sown crop with ratooning both in kharif and rabi seasons recorded high yield of grain as well as fodder. The results revealed that among the genotypes Co 24 recorded the highest grain yield of 3974 kg/ha as against 2493 kg/ha in the check viz., CSH 5, with an increase of 61%. In respect of fodder yield, the genotype TNS 27 recorded significantly higher yield of 4200 kg/ha than the others.

Crop Pattern	Yield of sorghum (kg/ha)	Yield of second crop (kg/ha)	Additional income (Rs/ha)
Sorghum (local) alone	855	—	—
Sorghum - Gingelly (Recommended two crop sequence)	1062	320	2437
Sorghum - Cowpea (Recommended two crop sequence)	888	322	1405

Raising a gingelly crop or a pulse crop like greengram or cowpea, utilising the even distribution of about 15 cm of rainfall during April - May apart from the sorghum crop during the North - East Monsoon was found feasible in the red soil belt of Avinasi and Palladam taluks

Crop Protection

At Coimbatore studies on the hourly attraction of sorghum grain midge *Contarinia sorghicola* to light trap were conducted. It was observed that more grain midge adults were collected between 8 and 10 P. M.

RAGI

Crop Improvement

Paiyur 1 Ragi : This is a pure line selection from PR 722 and is suited to rainfed areas of Salem and Dharmapuri

districts with a yield potential of 1800 kg of grain and 4250 kg of straw per hectare

Crop Management

The effect of seed treatment (seed hardening) on ragi conducted under dry condition on Paiyur 1 and on Co 11 under irrigation during the year 1981 - 82 and 1982 - 83 indicated that under both the conditions seeds treated with CCC 5 ppm solution (soaking seeds for 16 hours and drying under shade) recorded an increased grain yield of 12 per cent in Paiyur 1 and 28 per cent in Co 11.

Transplanting was found superior to direct seeding under rainfed condition for Paiyur 1 ragi.

In the trials conducted at Kumaraperumal Farm Science Centre during kharif and rabi, 1981 - 82, it was found that transplanting 25 days old ragi seedlings with three seedlings per hill was significantly superior over normal aged (18 days) seedlings in sodic soil.

Crop Protection

With regard to chemical control of ragi blast, spraying Kitazine 0.1% thrice controlled the disease effectively besides recording higher gain yield. Cuman L 0.3% was found to be the next best chemical in efficacy.

PANIVARAGU

Crop Improvement

Co 2 Panivaragu : This variety gives a mean grain yield of 1078 kg/ha which is 46.9% higher than that for Co 1

PULSES

BLACKGRAM

Crop Management

At Coimbatore, a field experiment on blackgram (Variety Co 4) conducted to study the response of blackgram to Ferrous in calcareous soil indicated that foliar application at the rate 2% spray gave significantly higher yield over control

For belated sowings of blackgram in the rice fallows of Cauvery delta (Aduthurai) the varities Kanpur followed by KM 2 and ADT 3 were found to yield 1538 kg/ha, 1471 kg/ha and 1304 kg/ha respectively.

GREENGRAM

Crop Management

For belated sowings in Cauvery delta (Aduthurai), the variety S - 8 gives significantly higher yield of grain (1518 kg/ha) over ADT 2 (1217 kg/ha). The yield increase being 22%.

Crop Protection

At Coimbatore, for the control of powdery mildew on Co 3 greengram, single application of "Tridemorph" (Calixin 0.1%) has been the best.

REDGRAM

Crop Improvement

CO 5 Redgram : This is an induced mutant of Co 1 redgram and matures in 110 days The average yield is 760 and 1440 kg/ha under rainfed and irrigated conditions respectively. This variety is tolerant to pod fly, sterility mosaic and root rot.

Crop Management

The rhizobial strain CC - 1 developed for redgram at Coimbatore, has given increased grain yield of 1068 kg/ha as against 724 kg ha for uninoculated control, amounting to 48% increase in yield. This culture tested at All India level, has given 21-45% increased yield over control.

The influence of kharif legumes on nitrogen economy on the rabi cereals studied at Vamban showed that kharif redgram intercropped with greengram recorded the maximum yield of the succeeding cereal ragi crop. Among the different levels of nitrogen studied, 40 kg ha recorded significantly highest yield

COWPEA

Crop Improvement

Paiyur 1 Cowpea : This is a pure line selection from VM 16 suited to drylands of Dharmapuri, Salem, North Arcot, Periyar and Ramanathapuram districts. On an average it yields 760 kg grain/ha. The seeds are bold and brick red in colour.

Crop Management

The variety C 152 inoculated with rhizobium strain DC 28 resulted in 11% increased yield over uninoculated control, at Vamban.

Crop Protection

At Coimbatore, soil application of Aldicarb 1 kg a. i/ha before sowing, followed by one round of Endosulphan (0.07%) spray at 50% flowering, controlled podborer of cowpea effectively and gave increased grain yield of 763 kg/ha over the untreated control. The cost of treatment worked out to Rs. 565/ha and the cost-benefit ratio was 1 : 5. 75.

MOCHAI

Crop Improvement

Co 2 Mochai : A hybrid derivative of the cross between Co 8 and Co 1, matures in 105 days and yields 1460 kg grain per hectare. The variety is photo-insensitive and moderately resistant to pod borer.

SOYBEAN

Crop Management

At Aduthurai studies on time of sowing of soybean Co 1 indicated that the yields were consistant when the crop was sown between January 8th and February 17th (Yield ranged from 929 kg to 1107 kg/ha)

Closer spacing (15 x 10 cm) significantly increased the yield of grain (1128 kg/ha) than control (30 x 10 cm) giving 940 kg/ha, recording an yield increase of 20%.

OILSEEDS

GROUNDNUT

Crop Improvement

CO 2 Groundnut : This is suitable for raising both under irrigated and rainfed conditions. and yields on an average 2710 and 1640 kg/ha under irrigated and rainfed conditions respectively. The variety is tolerant to "Tikka" disease.

Crop Management

Under rainfed condition at Tindivanam. TMV 7 groundnut was sown in different methods to study the moisture conservation and suitability for dry land tracts. The raised bed method gave maximum yield. Raised bed was found suitable because of its minimum weed population with maximum yield

Significant yield increase was obtained at Tindivanam by spraying Sodium molybdate at 1 kg/ha, just be-before flowering. This spray increased the yield of pods by 17 to 27%.

Application of azolla is beneficial to paddy and more so to the subsequently raised groundnut crop as a source of plant food.

SESAMUM

Crop Protection

At the Oilseeds Experiment Station, Tindivanam, of the fifty eight cultures evaluated for resistance to powdery mildew in 1981-82 and 60 cultures during 1982-83 four cultures viz., Si. 3315/5, Si. 3315/6, Si. 3315/10 and Si. 3315/11, recorded very low incidence of powdery mildew during both seasons These cultures were also found to be tolerant to *Alternaria* leaf spot. Of these Si. 3315/5 and 3315/11 were found moderately resistant to shoot webber.

SUNFLOWER

Crop Management

At Coimbatore the relative importance of each one of the management practices namely improved variety, normal and late seeding, full and 50 per cent level of fertilization and plant protection measures were evaluated. The non-monetary input viz., date of seeding seems to have greater influence on yield than the other practices Plant protection as well assumes more or less equal importance as that of time of sowing.

At Bhavanisagar intercropping studies with blackgram and sunflower in the ratio of 1:2 rows gave the maximum return from a unit area (4460 kg/ha). The cost-benefit ratio worked out to 1 : 1.22.

For realising maximum seed yield in sunflower, the optimum spacing and manurial requirements were assessed to be 45 x 30 cm, and 45 kg N and 80 kg P_2O_5/ha respectively.

CASTOR

Crop Improvement

TMV 5 Castor : This is a hybrid derivative of cross between SA. 2 x S. 284 2 and yields 921 kg/ha under rainfed conditions. This is suitable for Salem, Coimbatore, Periyar and Dharmapuri districts.

COCONUT

Crop Management

Application of herbicides in coconut gardens effectively supressess the weed growth as indicated by the lower fresh weight of weeds per unit area without any increase in the nut yield. On the other hand, ploughing twice a year increased the nut yield to the extent of of 21.2% over control. Moreover, ploughing is cheaper than weedicide application.

At Veppankulam, among the several materials tried, mulching with coconut husks two metres around the palm improved the yield by 49.7% followed by 44.6% yield increase due to burying coconut husk and leaves in trenches between the rows of palms.

COTTON

Crop Management

Studies on irrigation requirements of summer cotton revealed that irrigating the summer cotton at 50% available moisture was found to be optimum. Whenever there is scarcity of water, one irrigation at flowering and another at boll bursting can be skipped without any detrimental effect on cotton yield. However, withholding irrigations at seedling and squaring phases, and more than one irrigation at flowering phase reduces the yield considerably.

Investigations at Aduthrurai cropping pattern to realise maximum profit and yield per unit area in summer cotton revealed that maximum net profit of Rs. 10,835 could be obtained by adopting a three crop sequence of cotton intercropped with greengram followed by bhendi, followed by paddy as against the conventional farmers' practice of two crop sequence of cotton followed by paddy which has recorded a net profit of Rs. 9,875 per ha. Wherever there is a problem of disposal of bhendi, vegetable cowpea can be grown instead of bhendi since this cropping sequence has given a net profit of Rs. 10,121 per ha.

Crop Protection

Results of experiments on the effect of intercropping on the incidence of pests on rainfed cotton showed that cotton intercropped with greengram or sunflower suffered less damage by jassids than cotton raised as a pure crop. Cotton was raised on paired rows, 30 cm apart with one row of intercrop at 0 cm from cotton.

Dusting of Endosulfan 4% at 20 kg/ha at 10% damage level was observed to be economical for the management of boll worms under rainfed conditions. Dusting at 10% damage level recorded a monetary benefit of Rs. 1781/ha as compared to the standard dusting (once in 15 days) which recorded Rs. 1438/ha. Thus, a saving of Rs. 340/ha could be realised by dusting Endosulfan at 10% damage level instead of the usual practice of dusting once in 15 days.

A Single applioation of wet sulphur 40% W/W 1.6 kg a.i/ha recorded significantly highest reduction (94.7%) of mite population in cotton and it was as effective as that of continued application of wetsulphur 50% WP (1.87 kg ai/ha) and Dicofol 18% EC (360 g. ai/ha).

SUGARCANE

Crop Management

Fertilizer economisation is possible in sugarcane by adjusting the method of application. Pocket method of fertilizer application at the rate of 180 : 60 : 90 kg N, P_2O_5 and K_2O/ha at 10 cm depth was found sufficient as against the recommended dose of 240 : 60 : 120 kg N, P_2O_5 and K_2O/ha thereby effceting a saving of 25 per cent of fertilizers.

Gradual widening of furrows at 30 cm upto 45 days, followed by 55 cm

furrow width from 46th to 90th day and thereafter maintaining 80 cm, with an irrigation regime of 0.9 IW/CPE ratio, resulted in a saving of 15.7 per cent irrigation water in the studies conducted at Coimbatore.

FORAGE CROPS

LEUCAENA

Crop Improvement

CO 1 Leucaena : This variety yields 79.14 t/ha of green fodder over a cutting period of two years under rainfed conditions. The crude protein content is 25%.

Crop Management

The green fodder yield of Leucaena was maximum in the spacing of 50 x 20 cm recording 32.81 t/ha in a period of two years from seven cuttings under rainfed conditions. The yield under the spacing of 1 m x 10 cm was on par with it, being 30.37 t/ha. The population in both the spacings being 1,00,000 plants/ha.

For better nutritional status, cereal legume mixture assumes greater importance. Lucerne as a legume fodder is gaining foot-hold in Tamil Nadu. Sorghum and maize are the two important cereals grown for fodder. An attempt was made to mix the fodder legume with fodder cereals. The results revealed the advantage of growing fodder maize as intercrop in lucerne for higher forage yields. Sorghum is not a suitable intercrop for lucerne. Application of 60 kg N and 25 kg P_2O_5/ha after harvest of each fodder crop is suggested for higher tonnage of 255 to 258/ha/year of green fodder. This system envisages raising six crops of fodder maize with lucerne. The lucerne plus fodder maize association is able to realise a net income of Rs. 25, 400 ha/year with a return of Rs.3.52 per rupee of investment.

A trial on sylvipasture under rainfed conditions was conducted with three tree species viz., *Leucaena leucocephala*, Agathi, and *Sesbania aegyptica*, two grass species viz. *Cenchrus ciliaris* and Guinea grass (*Panicum maximum*) and two legumes viz., Velvetbean and cowpea. Tree specing of 3 m x 50 cm in between which grasses and legumes were grown in alternate rows of 50 cm apart. During the two year period of trials 1981-82, 1982-83, ten cuts of grasses, seven of trees and two crops of legumes were taken. Since both years experienced drought, the green fodder yield was found to be quite below normal. However, the results revealed that the combination of Leucaena + Cenchrus + Velvetbean ranked first recording 25.82 t/ha followed by S. aegyptica + Cenchrus + Velvetbean with 25.41 t/ha.

HORTICULTURE

POMOLOGY

BANANA

Co 1 Banana : This was evolved out of a multiple cross. The average bunch weight is 10.57 kg and the quality is similar to that of hill banana "Virupakshi".

Crop Management

In Robusta banana, black polythene mulched plot gave a yield of 112.90

t ha as against 76 83 t ha in the control plot. Chopped banana pseudostem mulch and sugarcane trash increased the yield over the control by 9 and 19 t ha respectively.

Crop Protection

The studies on the influence of repellent crops in banana revealed that coriander grown plots had the lowest nematode (*R. similis*) population of 7 as against 1'0/10 g of root recorded in the control.

PAPAYA

Crop Protection

All the promising papaya types were tested for their nematode resistance and among the types, CP 49 and CP 15 recorded the lowest population of root-knot and reniform nematodes.

GRAPES

Crop Protection

In a trial conducted at Agricultural College and Research Institute, Madurai for the control of nematodes in grapevine, Aldicarb at 4 kg ai ha was found to be the best besides increasing the yield. The yield was 14,250 kg/ha in the treatment compared to 7,750 kg/ha in the control. The expenditure on the chemical application was Rs. 1800/ha and the value of additional production over the control was Rs. 11,200/ha.

ACID LIME

Crop Management

The performance of acid lime plants budded on rough lemon, Troyer citrange, Ranpur lime, and Acid lime seedlings was evaluated. The plants on rough lemon recorded 780 fruits/tree, weighing 89 kg.

Foliar application of Zinc as Zinc sulphate at 0.5% to acid lime thrice a year (March, July and October) after the emergence of new flush improved the vigour of tree as well as fruit yield. The trees that received zinc recorded 1642 fruits tree year as compared to to 1270 fruits recorded in trees which received only water sprays representing an increase of 30% over the control.

Crop Protection

For the control of citrus leaf miner (*Phyllocnistis citrella*) seven pesticides were tried. Spraying of permethrin, cypermethrin and fenvalerate at 0.1% concentration controlled this pest to an extent of 82, 86 and 87% respectively.

SPICES

CARDAMOM

Crop Management

At Yercaud, the best planting season for cardamom was assessed to be the month of July with the highest establishment rate of 87.92.%

TURMERIC

Crop Management

The planting of turmeric after banana or solanaceous vegetables should be avoided or else proper nematode control measures must be followed.

GARLIC

Crop Management

Nitrogen at 120 kg/ha recorded highest bulb yield of 24.33 t/ha.

The optimum spacing was found to be 5 cm between plants which registered significantly highest yield of ?9.95 t/ha as compared to 15 cm and 10 cm spacings.

PLANTATION CROPS

CASHEW

Crop Protection

Endosulfan (0.07%) was found to be effective in controlling thrips, inflicting a high mortality rate of 98.9%, followed by Phosalone (0.07%), Decamethrin (0.003%) and Cypermethrin (0.003%).

COFFEE

Crop Protection

Modified Monocrotophos padding method against sucking pests and borers had yielded encouraging results. In Arabic and Robusta varieties, 100% mortality of green and brown scales was observed 72 hours after the padding treatment.

MEDICINAL AND AROMATIC PLANTS

PYRETHRUM

Crop Management

Picking the Pyrethrum flowers at intervals of 7 or 14 days enhanced the total number of flowers picked and their pyrethrin content as well.

GERANIUM

Crop Management

Harvesting at 12th nodal level was found to maximise the herbage yield, registering 18 00 t ha with an oil yield of 19.89 kg.

Rock phosphate applied in 3 splits during May, July and September was found to be the best source of phospo rus to obtain higher herbage and oil yield.

A specing of 60 x 40 cm was found to be the best for higher herbage and oil yields.

OLERICULTURE

BRINJAL

Crop Improvement

PKM 1 Brinjal : A mutant of the local "Puzhithikathiri" and adaptable to southern districts of *Tamil Nadu* has a yield potential of about 35 t ha in 150 - 155 days.

Crop Protection

The trial on the interaction between VZ *Mycorrhizae* and root knot nematode indicated that whenever soil was pre-inoculated with mycorrhizal fungi, the plant exhibited vigorous growth. Whenever plants were inoculated with VAM fungi and nematode simultaneously, all the plants survived and showed good growth. However, post inoculation of VAM fungi (after 20 days) and reinoculation with nematode did not help the plants to survive. The results revealed that VAM fungi was interfering with nematode infection process and preinoculation with fungi might help in the warding-off of the root knot nematodes.

CHILLIES

Crop Protection

For the control of fruit borer (*Spodoptera litura*), synthetic sex

pheromone was field tested for its efficacy in attracting the males. The number of male moths traped was 44 per day in a trap mostly during 8 - 10 p. m. A reduced caterpillar population was also observed in chillies on subsequent days after adult trapping.

TAPIOCA

Crop Improvement

Co 2 Topioca : This varity yields about 37.55 t/ha in a duration of 8½ to 9 months. The tubers have a high starch content of 34.5% and the tubers are suited for both direct consumption and industry.

BHENDI

Crop Management

In MDU 1 bhendi, a combined application of 12.5 t of FYM and 25 kg of Zinc Sulphate per hectare in addition to the recommended dosage of NPK resulted in yield increase as well as better nutrient uptake.

BITTER GOURD

Crop Improvement

MDU 1 Bitter gourd : This new variety yields 32 t/ha and the fruits have less seeds. The quality of the fruit is superior with a TSS of 4.2%.

RIBBED GOURD

Crop Improvement

Co 2 Ribbed Gourd : This is a selection from local Coimbatore type. The fruits are long (120-135 cm), slender and light green in colour and this variety yields about 25 t/ha in about 110 days.

ONION

Crop Protection

Post Harvest Technology : In the post harvest technology studies with Co 4 onion, it was found that weight lose, sprouting, rooting and rotting were the least in the bulbs treated with 2 kv of gamma rays and stored in the perforated trays. The TSS content of the bulbs was the highest in Ethral treatment (250ppm) while total sugars, reducing sugars and ascorbic acid contents were the highest in untreated bulbs stored in conventional structures.

FLORICULTURE

JASMINE *(Jasminum grandiflorum)*

Crop Management

Studies were undertaken to assess the water requirement of pitchi (*Jasminum granditlorum)* at Coimbatore under two different manurial regimes for two years. Irrigation at 60% ASM recorded higher flower yield during both the years with a two year mean of 11,902 kg/ha accounting for 20.33% increase over the control while irragation at 40% ASM gave only a marginal increase of 6.4% in yield. But irrigation at 20% ASM depressed the yield by 9.2%.

BARLERIA

Crop Improvement

Co 1 Barleria : The flower colour of the new variety is attractive pink having better consumer preference. The per plant yield is 2.11 kg in 210 days.

FOOD SCIENCE AND NUTRITION

Studies on Mycotoxins

Food grains and other commodities were surveyed for the persence of different mycoflora and mycotoxins. A total of 190 samples consisting of rice, maize, sorghum, redgram, groundnut, coconut, mango and banana was analysed. Among these 107 were found contaminated with different fungi. *Aspergilli Penicillia* was the predominant fungus besides *Curvularia fusarium, Rhizopus, Botryodiplodia Ghaetomium sclerotium, Macrophomina* and *Colletrichum.*

In groundnut and paddy, pre-harvest disease stress conditions had little influence on the development of storage fungi when the commodity was stored above safe moisture limits.

FORESTRY

EUCALYPTUS

Crop Management

Annual crops like sorghum, groundnut, gingelly and cotton were grown conjointly with fast-growing perennials like *Casuarina* and *Eucalyptus*. When the perennial is one year old, growth of the annuals was invariably not affected but their growth was considerably vitiated when the crop was three years old indicating that under irrigated conditions, intercropping may not be a rewarding practice when the tree crops are over two years old.

AGRICULTURAL AND RURAL DEVELOPMENT STUDIES

AGRICULTURAL ECONOMICS

The cost of production of jaggery in Tamil Nadu was estimated at Rs. 174.54 per quintal of which the fixed cost was 13.95 per cent. The percentage of recovery of sugar varied between 8.93 to 9.99, the average being 9.27. Average cost of sugar production was Rs. 332.50 per quintal, and the average price was Rs. 359.63, leaving a profit of Rs. 27.13 per quintal

It was recommended that price poicy should take into account the cost of production of sugarcane, price of sugar as well as the price of jaggery.

The study on 'Marketing Decisions of Farmers' revealed that the entire marketed surplus of food grains was sold to the village merchants in Periyar district for two reasons . i) selling to village merchants was their traditional practice and ii) farmers received loans from the village merchants and hence were necessarily to sell them. These two reasons were influencing to a greater extent in the marketing decision behaviour of the farmers who preferred selling groundnut and cotton also to village merchants.

It was estimated that farmers stand to gain Rs. 45.50 per quintal of groundnut pods if it was sold in the form of kernels, than as pods.

The study conducted in Aruppukkottai taluk revealed that the size of the rainfed lands varied from 0.40 to 42.11 hectares with a mean of 5.17 ha while 76.67% of the farmers owned less than the average size and the mean land size of these farmers was 2.25 ha only. The study suggested a new cropping pattern of raising kudiraivali for grain purpose in 0.40 ha, cotton along with pulses in 1.62 ha and fodder-cholam in

0 25 ha. This new cropping pattern reduced the cost of cultivation by Rs 124 40 and increased the net returns by Rs. 547.50 for the average holding size of 2.25 ha of dry lands.

AGRICULTURAL EXTENSION EDUCATION

The main reasons for preferring custom service and contract work (CSCW) in rice farming were found to be : (a) it was economical, (b) operation could be completed in time, (c) it helped to overcome labour scarcity, and (d) there was not much botheration as met with in the employment of labourers on daily wages. Non-monetary improved farm practices like line planting, maintenance of optimum spacing, depth of planting, number of seedlings per hole and shallow puddling became impracticable because of CSCW.

Lack of timely financial assistance to carry out certain capital intensive farm operations was the main impediment for farm development and consequent better living. Low literacy level, low social participation, low media participation, low economic motivation and medium level of aspiration were identified as factors responsible for low level of living.

A study on the level of employment among 246 agriculturists and 154 agricultural labourers in Thanjavur district showed that in the old delta 81.14% of farmers were employed for less than 150 days a year and the rest were employed for 151-250 days a year. There was no full employment (of 300 days) for any member of farm families. In new delta, 1.6% of farmers found full employment. The employment for farmers on an average was more in the new delta than in the old delta. In the old delta employment for women never exceeded 175 days and 82% of them worked for less than 150 days. In new delta also the results were the same in this respect.

In cotton, the technical aspects such as plant protection measures, acid treatment, spacing and manuring the level of knowledge was found to be minimum.

As regards sources of information received by the respondents for adoption of improved practices of cotton cultivation only about 15% of the respondents gained knowledge through Extension Agents directly.

Another study indicated that the following roles were performed by the leaders in the selected villages as perceived by their followers.

1. Securing and supplying seeds, fertilizers, pesticides, implements, electric motor etc., to the farmers
2. Arbitration of disputes.
3. Organising common action in the village.
4. Providing information and advice on farm practices.
5. Acting as spokesmen for the whole village with the officials.
6. Identifing the weaker sections among the people and
7. Helping in decision making.

AGRICULTURAL ENGINEERING

A study was conducted to assess the energy requirement pattern for

irrigation of cotton crop by varying the energy machinery system Ridges and furrows (by using Tractor drawn ridger), long bed furrows (by using Tractor drawn long bed furrow forms developed at TNAU) and beds and channels were the systems compared. Out of these the long bed furrow system consumed minimum total energy for crop production. The output-input ratio was also found to be higher in long bed furrow system.

A sail type water lifting windmill was developed This has a six sail rotor of 5 m diameter, coupled with a reciprocating pump and can be put to use for pumping water in areas where the wind speed exceeds 10 KMPH.

A wind mill has been designed, developed and erected at Tamil Nadu Agricultural University for developing 60 watts of electricity at 20 KMPH wind speed The performance under field conditions was found to be good.

A solar flat collector with copper absorber plate and ss pipe has been fabricated. Test run with water revealed thar on a cleaner, cloudless day, water reached a temperature of 75-78°C in a single pass with a flow rate of 10 litres/hour.

Coir-cement corrugated sheets were developed using coir fibre as reinforcement along with the cement. Each sheet had a thickness of about 1 to 1.25 cm and the size was 1.5 sq m. It costs about Rs. 23.20 per sq. m and can be used as roofing material for farm buildings.

Portable white ash cement slabs have been developed with a proper mix of agricultural wastes like paddy husk ash, coconut coir and cement-sand mixture. Each slab is of 90 x 60 x 4 cm in size The cost of fabrication of these slabs worked out to Rs. 922 per hundred whereas concrete slabs cost about Rs. 1026 per 100 Thus, these slabs result in a saving in cost by 10 per cent.

A bullock drawn implement capable of forming broad based beds of 15 cm width was developed. This unit could form furrows of 40 cm top width with an average depth of 15 cm.

A sugarcane sett cutter was developed to cut 6 setts at a time. The setts should be cut at 2.5 to 3.7 cm from the node uniformly in all setts, which is made possible by using this cutter.

The wells, which suffer from the problems of inwash of fine sand particles, collapse due to caving-in of the side wall. The problems are quick sand, bottom caving and top caving. As a remedial measure, inverted filter with ¾ inch jelly of 2" thick layer and 1½" jelly with 3 thickness viz., 3", 6" and 12" was tried. From the study it was seen that a filter of 1½" jelly with 12" thick layer underlain with ¾" gravel 2" thick layer was effective in arresting movement of sand particles into the well.

VETERINARY AND ANIMAL SCIENCES

CATTLE

Addition of 10, 20, 50 or 100 mg of BHC per g of paddy straw did not interfere in the *in vitro* digestibility of its dry matter, cell walls, cellulose and hemicellulose.

It was found that TVFA production was depressed at 50 mg level of B.H.C per g. of paddy straw. However, the

bacterial count was not affected. Protozoa number was affected only at 400 mg level of BHC per g. of paddy straw. Since no viable count was made, it is likely that dead bacteria and protozoa are counted. The results, thus suggest that the feeding of pesticide contaminated paddy straw may be harmful to animals depending upon the level of BHC and care should be taken in feeding such material to cattle

It is noted that Jersey as well as Jersey-Sindhi cross excel Sindhi in traits like age at first calving, service period, number of services per conception, dry period and intercalving period, but lactation yield of Sindhi exceeds that of Jersey at Hosur cattle farm.

Nivaquine 10% solution at the rate of 5 mgm/kg. body weight was used to 30 animals (cattle) which suffered from Theileriasis; 6 animals were cured. No untoward reactions were seen while or after the treatment with Nivaquine. The average days taken for cure in this treatment was 4 days

The variations in the changes between fresh and stored cara-beef in all the six characteristics, namely pH, water holding capacity, extract release volume, Tyrosine value, TBA number and odour score were found to be highly significant. A highly significant correlation was noticed between the initial and final values of the two characteristics namely ERV and TV. The ERV and pH of the stored cara-beef is significantly negatively carrelated. A highly significant correlation is noticed between ERV and odour score of both fresh and stored carabeef. The regression coefficient between fresh and stored carabeef for all the 6 characteristics were found to be highly significant

The combined preservation with liquid nitrogen and freezing mixture showed the longest period of safe-keeping namely 45-78 hours, whereas preservation with freezing mixture alone showed a shelf - life of 44-42 hours with liquid nitrogen and water ice combination keeping the meat safe for 43.21 hours. Considering the availability and the cost of preservation employed it is safe to recommend the wider usage of freezing mixture consisting of water ice and salt in the preparation of 3 : 1 at 10 kg of freezing mixture for every one kg. of meat.

The dye 2, 3, 5, - Triphynyl Terrazolium chloride is not as sensitive as the other two dyes i. e. Methylene Blue and Resazurin, when used in the dye reduction test for testing the fitness of raw milk for processing on the basis of bacteriological quality.

There is no significant difference in Free fatty acid content in milk from cows of different stages of lactation. Hence, the stage of lactation need not be considered in choosing milk for manufacturing of dairy products.

Vitamain-A and Beta-carotene in the blood plasma are significantly lower in buffalo calves when compared to white cattle calves (i. e. Vit. A. 62.52 mcg/100 ml. and Beta-carotene 244.16 mcg/per 100 ml.

The bull semen could be frozen and preserved in Mini straws equally well and are comparable to Medium straws. Addition of glycerol and filling of semen could be undertaken in the initial diluent and at room temperature. This saves time and dispenses the use of cold handling box.

An economical field freezing unit designed in the Frozen Semen Laboratory has been found to give good freezability thus, custom freezing of semen from bulls located in distant farms could be undertaken. The samples had mean prefreeze and post thaw motility of 71.44 $\pm$ 0.54 and 38.35 $\pm$ 0.42% respectively. Highly significant differences between bulls were noted for prefreeze motility.

The conception rate with Medium straw was 39.8% and with Mini straw was 39.7% indicating that both packaging did not show any significant changes and that Mini Straws could be advocated to the field workers without any reservation.

It was concluded that the Erythrocyte pottasium concentration in the buffaloes exhibited a bimodel distribution but has no significant assocation with milk yield to merit consideration as a marker gene for improving milk yield.

SHEEP AND GOATS

Feeding of urea does not generally influence the mineral status of blood serum of sheep.

Feeding of either untreated groundnut hulls or sodium hydroxide (Up to 5%) treated groundnut hulls did not in any way alter or influence the ruminal amino transferase enzyme activity. This implies that transaminations were occurring at the usual rate and that it could be expected that ruminal protein synthesis was normal.

The inclusion of groundnut hulls as a roughage, either raw or processed did not have any significant influence on weight gain of sheep of various groups. The feeding of groundnut hulls did not produce any toxic effect nor did it change the percentage of meaty cuts, bony cuts and internal organ weights. The histopathological examination of different internal organs did not reveal any change

A study on electrical stimulation of sixteen tough mutton carcasses with an alternating and uninterrupted electrical power passage of 440 volts 50 herzts with 6 impulses per minute, for 5 minutes employing suitable unstimulated controls showed the advantages of the technology as follows.

Electrically stimulated mutton :
(a) attaiend an ultimate lowering of pH 5.5 at 11.53 hours in room sample and at 14.19 hours in refrigerated sample whereas the control room sample touched the peak pH at 17.44 hours and the refrigerated control at 1 33 hours.

(b) had higher moisture content of 1 - 2 per cent.

(c) a higher water holding capacity recorded at any time intervals.

(d) a lower fibre diameter,

(e) a lower shear force value and

(f) a lower chew count.

Serum Alkaline phosphatase types and body weight upto one week of age were examined in 143 Madras Red and 114 Mandya Sheep stationed at Livestock Research Station, Kattupakkam. No association between SAH types and growth was encountered in the two breeds studied.

Efforts were made to freeze Bucks semen using Tris and Sodium citrate

diluents. Two levels of glycerol viz., 5% and 6% were tried for both the diluents Two equilibration period of 3 and 4 hours were adopted. The results indicated that Sodium citrate diluent with 6% glycerol level and 3 hours equilibration period was found to be the most ideal of the eight combinations tried. The semen was presarved in 0.5 ml French Medium straw.

POULTRY

A batch of 580 Japanese quails was divided into two groups one group reared on litter floor and another group on wire floor cages. The economics of rearing them upto 5, 6, 7, 8, 9 and 10 weeks of age and selling them either as live or ready-to cook quail were worked out based on their live weight, feed intake, livability and existing costs of feed and ready to cook weight.

The results indicated that at all the ages studied rearing in cages had resulted in better body weight gain and feed efficiency than rearing on litter floors. For table rates, either as live or dressed bird, five weeks of age appeared to be more economical than at later ages due to poor body weight gain beyond this age About 10% more monetary returns obtained by sale of ready-to-cook quail over live sales is offset by the additional processing and packing costs involved in the former.

The percentages of fertility and fertile hatchability were significantly higher in medium and large eggs, over small sized eggs in Japanese quails. On the other hand, slight reduction in fertility and hatchability was noticed in heavy mottled eggs. Storing quail eggs beyond six days even at controlled temperature (18-21 C) and relative humidity (75%) appeared to have a detrimental effect on hatchability. Japanese quail eggs weighing around 10g, with light block or blue mottling and stored for less than 6 days appeared to be ideal for optimum hatchability.

With regard to commercial broiler chicks the weight gain was better in Cobb strain in the agroclimatic condition of the City of Madras. The broilers attained an average body weight of 1.45 to 1 60 kg at the end of 8th week with a feed efficiency of 2.4. The mortality registered was around 3% on an average. The profit margin realised was about Rs. 4 to Rs. 5 per bird under standard management conditions. The broilers could not withstand the soaring heat of summer, when the profit realised was almost nil.

Rhode Island Red (RIR) and New Hampshire (NH) breeding flocks were fed with standard breeder mash or (T1) supplemented with trace minerals and vitamins in feed (T2) or drinking water (T3). Data on feed consumption and egg production were recorded. The eggs were set to study the effect on fertility and hatchability.

Nutrient supplementation through feed or water had signifiacntly improved the egg production but not fertility and hatchability in Rhode Island Red and New Hampshire.

A trial using 3 different layer mashes on 24 white Leghorn Layer birds for each of the three types was conducted. The three mashes were (1) P.R.S. Layer mash (2) TAPCO layer mash and (3) Computer formulated layer mash. The results indicated that birds fed with

P. R. S. Layer mash yielded more eggs and though the computer formulated feed produced less eggs, it was found to yield more income than the others since the feed cost was less.

Hatching eggs collected from R. I. R breeding flock of 30 to 55 weeks of age during three seasons viz, winter, spring and summer were set to study the effect of age and season on fertility and hatchability. The results of the study indicated significant difference in fertility and fertile hatchability between the three seasons as well as age of the flock ranging from 35-55 weeks of age.

Ten male and ten female meat type chickens and Japance quails and ten male ducks of eight weeks of age were subjected to slaughter studies. The data on the blood, feathers, ready to-cook giblets, neck, breast, back and leg yields were recorded and analysed. The percentage of blood was significantly higher in ducks followed by quails, whereas ready-to-cook yield was higher in quails followed by ducks. In ducks, the giblets, neck and back yields were significantly higher than in other species. The breast and leg yield were significantly in favour of quails and chicken respectively where as wing yields were significantly low in quails.

Another experiment revealed that heritability estimate can be obtained through half sib correlation with more precision, since in all the three generations, the standard error obtained was low comparable to other methods. Consistently higher estimate of heritability of Intra-sire regression of off-spring on dam is reflective of possible influence of maternal effect on the traits. Possibily for the same reason the heritability estimate from dam component from full-sib variance was found to be higher in the first generation.

FISHERIES

The experiment on mariculture of fishes revealed that bivalves, seaweeds, barnacles, polychaetes and simple and compound ascidians causing fouling of cages.

Polyculture of *Mugil* sp and *Penaeus indicus*. was attempted in a double layered pen of 15 m². The stocking densities of these species were 33000/ha and 16000/ha and the culture period was 90 days. The growth recorded was 13.5 g for *Mugil* sp and 13.3 of for *P. indicus*. The above experiment clearly indicated that polyculture of fin fish and shell fish could be undertaken in brackishwater pens without supplementary feeding.

Adults of *Artemia* were collected from the salt-pan areas of Thirespuram, Karapad area and Veppalodai along the Tuticorin coast. The animals were recorded during February to September. The population density was assessed at 9450 animals/sq. metre area. The cysts were collected during March to September. The culture of Artemia was done at Pullavazhi salt-pan area and the cyst can be produced within a period of 25 days.

The Operational Research Project on fish culture revealed that supplementary organic manure with Eichornia (200 kg/800 m²) reduced manuring cost. To minimise cost of feeding, supplemental feeding with Azolla and Lemna could be followed.

Composite fish culture of Indian and exotic carps was experimented in four earthern ponds. As in the previous year, the pond No. 1 gave the maximum fish production of 6503.7 kg/ha/yr (net) owing to the better growth rate of individual species and better surviual rates when compared to other ponds. In the absence of silver carp, catla did not show an appreciable growth rate when compared with previous experiments possibly due to higher stocking rates. Rohu usually a slow grower, showed equitable growth rate (122.3 g/month). when the culture pond was planted with dry palmyra leaves, which in turn developed periphytons for feeding by rohu. The milk fish incorporated in all the four ponds as an additional species, was found to grow better than common carp. In one of the ponds it showed an average monthly growth of 114.5 g, which can well be compared with the growth rate of major carps. The grass carp, when planted in advanced fingerlings stage recorded best growth rate (255.7 to 271.5 g/month).

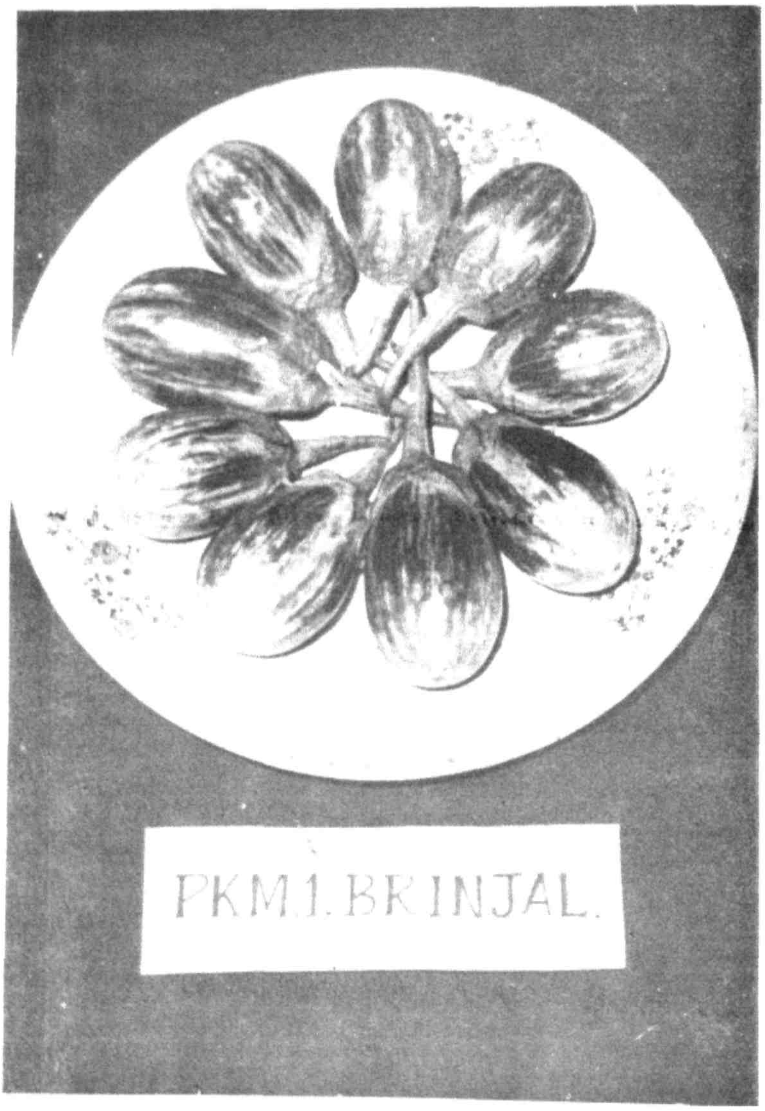
The breeding of mirgal during off-season was successfully done by administering preparatory doses of pituitary extract to the females at weekly intervals. The hatching percentage was 22. The catla failed to respond and recorded no development in gonads

The experiment on phosphorus enrichment through sewage pollution revealed that in the old Fishing Harbour area of Tuticorin, the sewage of the town was found to be directly released into the semi enclosed body of water. Hence tidal mixing was not very effective in diluting the sewage water. The sewage contained very high concentration of phosphorus (nearly 12 times higher than that recorded for the nearshore waters). This polluted water was utilized for growing algae under laboratory conditions. Appreciable growth of Oscillotoria sp. was recorded when the sewage water was diluted 15.20 times with fresh water.

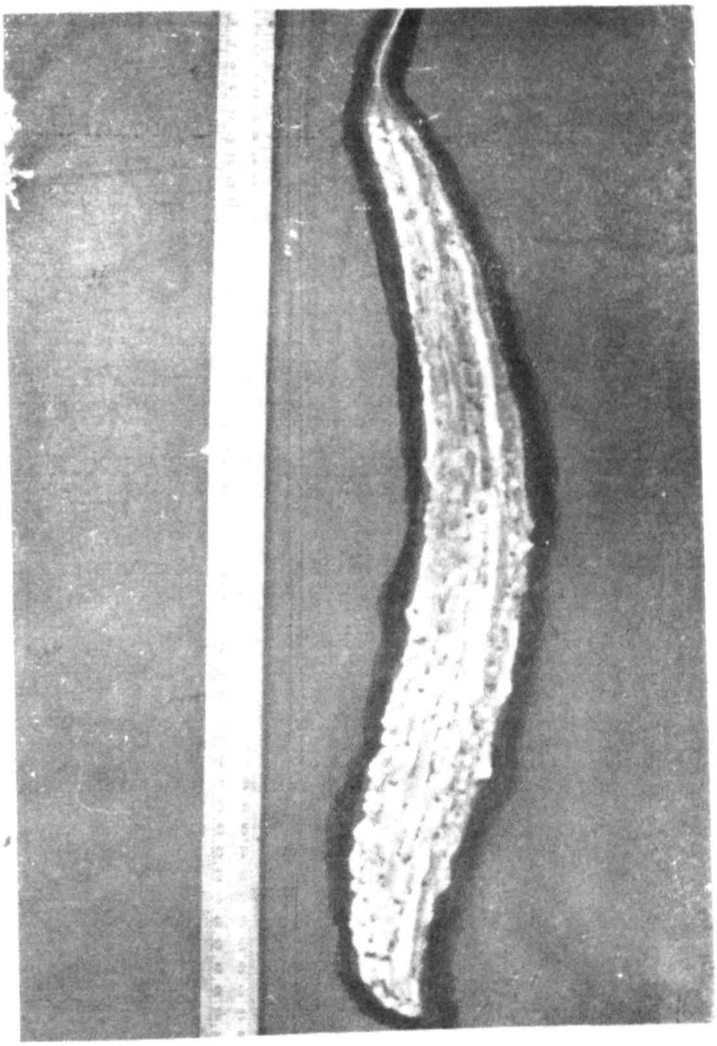
The chemical composition of sea weeds was studied *Sargassum wightii* showed the highest percentages of protein (12.35) and sugar (1.2). *Acanthophora delilii* showed the highest fat percentage (3.00).

The experiment on the biology and culturability and of freshwater prawn *Macrobrachium idae* revealed that the species is an omnivorous feeder, feeding mainly on crustacean and molluscan remains. Detritus and diatoms were more in the gut contents in all the months. However diatoms formed the main food only in juveniles. The feeding intensity was poor in matured animals and was high in juveniles.

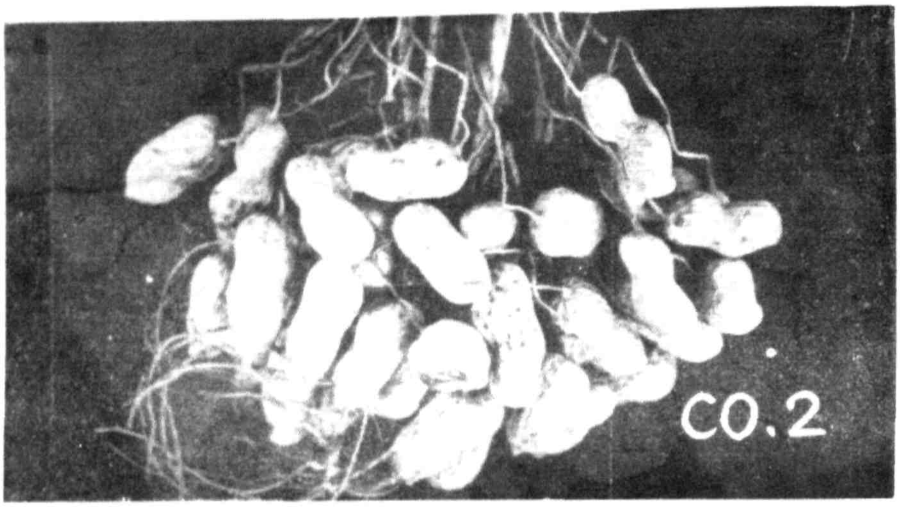
Studies on the ova diameter frequency, seasonal occurrence of maturity stages, gonado somatic indices and relative condition factor (Kn') values revealed that spawning season for *Macrobrachium idae* extends from September to February/March with a peak from October to January. The length at minimum maturity was found to vary between 45 and 50 mm (total length) This is also confirmed by higher Kn' values in the above length groups. Fecundity studies have showed a direct and significant correlation with total length and body weight of the prawn.



PKM 1 Brinjal

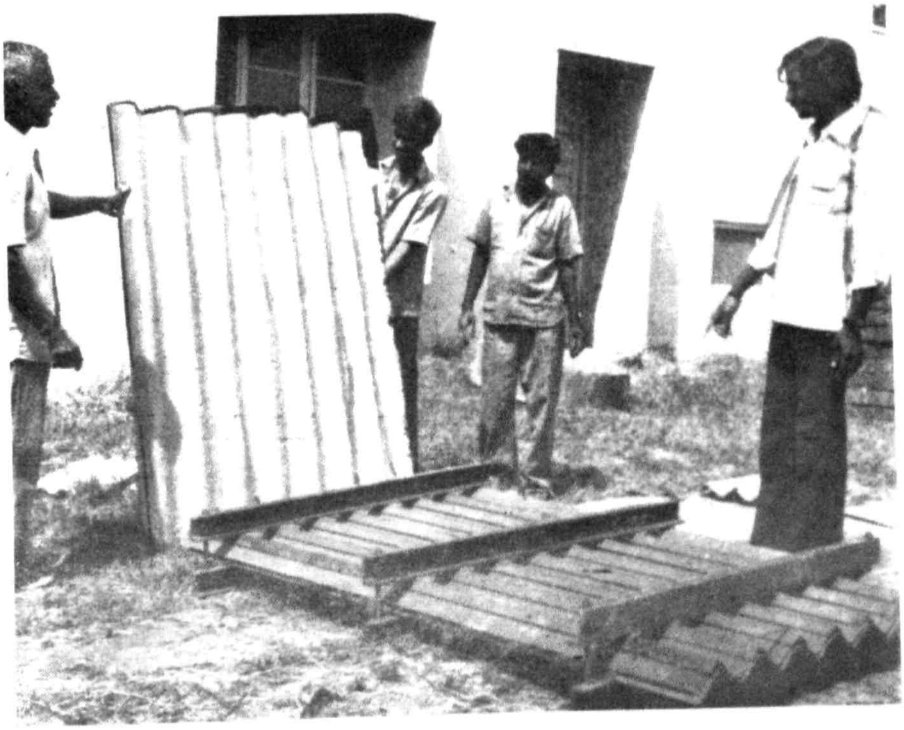


MDU 1 Bittergourd

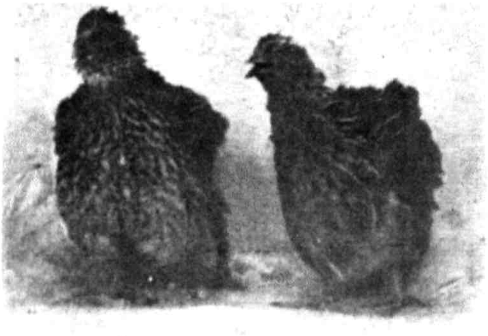


Co 2 groundnut

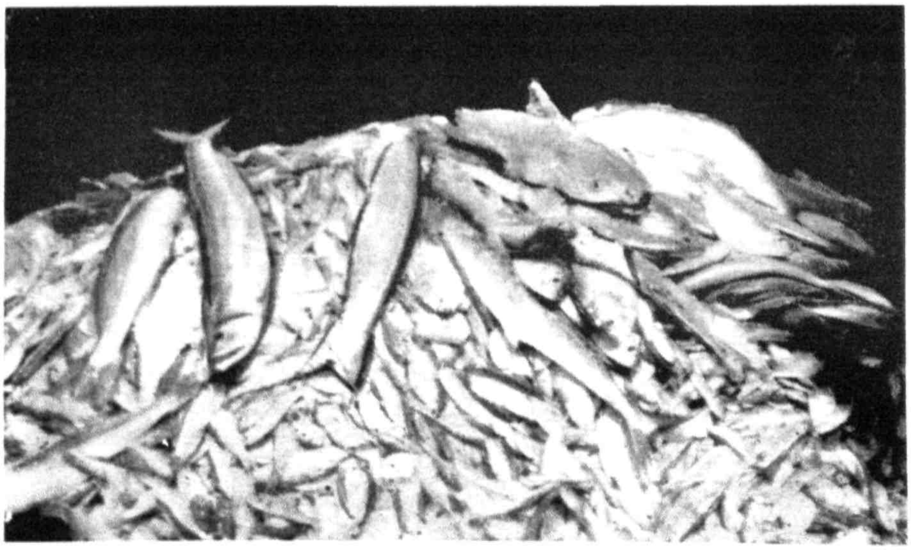
Demonstration of hand operated groundnut decorticator



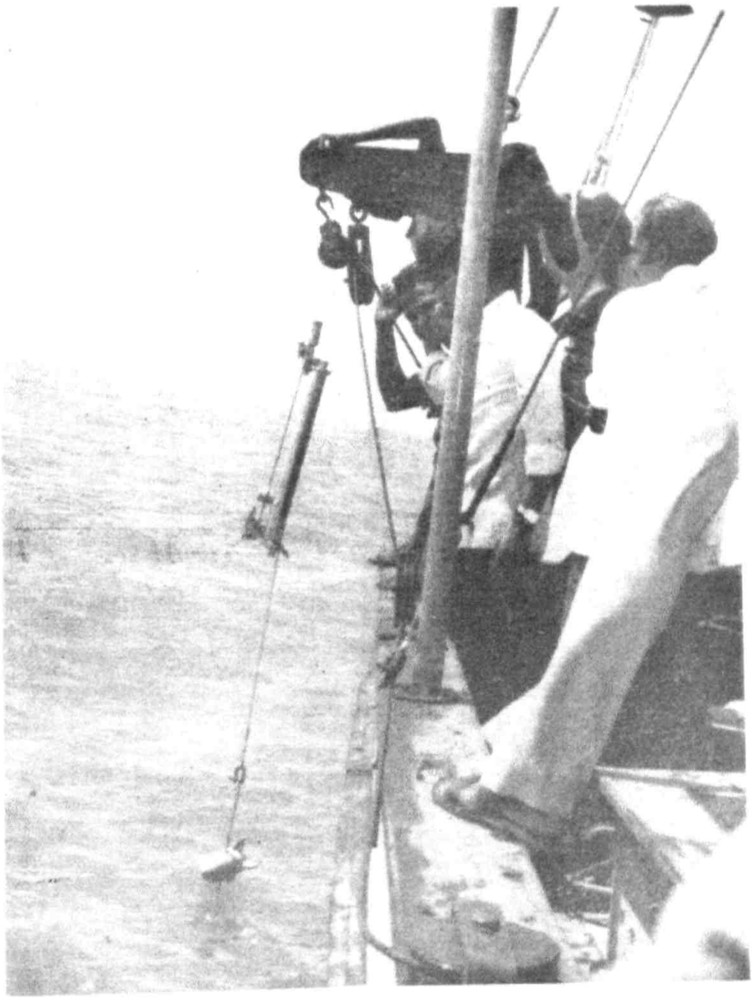
Coir cement corrugated roof sheet



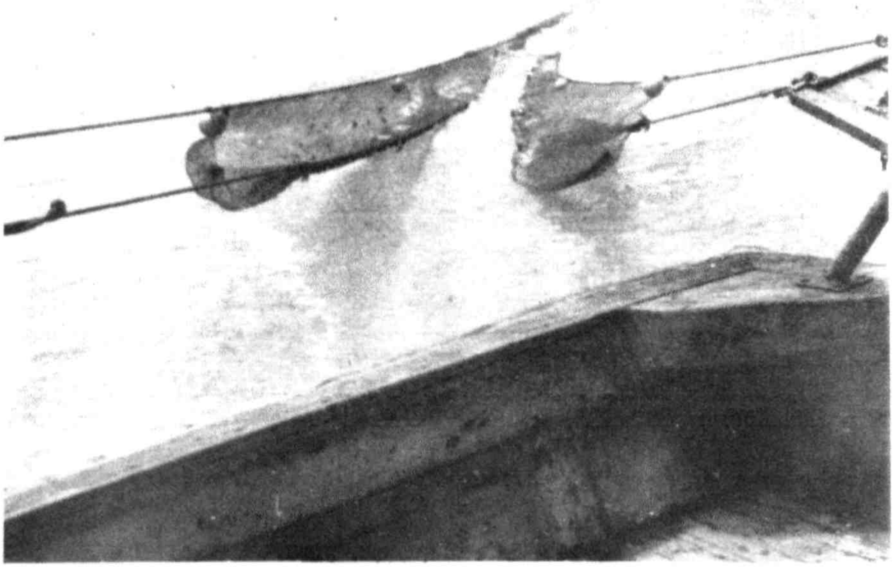
A pair of Japanese quails for meat



Trawl net catch



Collection of water samples from the vessel "Dolphin"



Survey by "Dolphin" using trawl net

Regional Research Workshop at Tamil Nadu Rice Research Institute, Aduthurai

Co 2 Panivaragu

5. EXTENSION EDUCATION

The dissemination of latest and improved technologies of the University was carried out by the Directorate of Extension Education through various communication channels and extension methods.

AGRICULTURAL EXTENSION EDUCATION

1) Training Programmes

The Training and Visit System was in operation in the entire State. The TNAU has nominated a team of Scientists in each district for participation in the monthly workshops. Appropriate management practices and innovations of the TNAU were presented to the State Department subject matter specialists for discussion at these workshops and for transmission to the Village Extension Workers and Agricultural Officers in subsequent training sessions. During the year 1983-84, 34 trainings were conducted by the Directorate of Extension Education to the T & V staff on different subject matters such as crop production techniques for rice, millets, pulses, cotton, oilseeds and horticultural crops, water management, weed management, pest surveillance, bio-fertilizer and climatology.

A workshop on linkage between research and extension under T & V system was conducted by the Directorate in which officials from the World Bank, State Department of Agriculture and Scientists of TNAU participated.

Two batches of I.A.S. probationers, three batches of prerelease defence personnel, students and unemployed youth were also given training according to their needs. One batch of I.O.B officers and two batches of NABARD staff were trained in agricultural production techniques.

2) Lab to Land Programme

The second phase of Lab to Land Programme was implemented through seven TNAU centres viz., Krishi Vigyan Kendras at Coimbatore, Madurai, Trichy and Pondicherry; Regional Research Stations at Paiyur and Vridhachalam and Tamil Nadu Rice Research Institute, Aduthurai. During this phase the TNAU centres adopted 400 families. Based on the bench-mark survey on the basic particulars and resource potential of the farm families, suitable farm plans were prepared besides transferring the improved and appropriate technologies to farmers. The critical inputs were identified for each farm family and distributed to the small, marginal and landless labourers. Under this programme, the farmers of the selected villages were educated to do the improved farming. This educational component has brought out good attitudinal change among them. Many success stories were recorded.

3) Village Adoption under the New 20 Point Programme

Eight TNAU centres viz., the Krishi Vigyan Kendras at Coimbatore, Madurai, Trichy and Pondicherry; the Regional Research Stations at Paiyur and Vridhachalam, Tamil Nadu Rice Research Institute, Aduthurai and National Pulses Research Centre, Vamban at Pudukkotai adopted a total of 16 villages. TNAU innovations were disseminated. The supply of inputs to small farmers, marginal farmers, agricultural labourers and persons belonging to Scheduled Castes and Scheduled Tribes was arranged in these villages. Bench mark survey was conducted to assess the existing conditions in the villages. Arrangements were made for the supply of the required seeds and fertilizers for the crops grown On-campus and off-campus training programmes were conducted at all the eight centres on different crop production technologies.

4) Krishi Vigyan Kendras

At present four Krishi Vigyan Kendras are functioning at Coimbatore, Madurai, Trichy and Pondicherry under Tamil Nadu Agricultural University. These Kendras conducted both on-campus and off-campus training to disseminate the innovations of TNAU to farmers, farm women, rural youth and village artisans. In addition to training and dissemination of TNAU innovations, the Krishi Vigyan Kendras carried out Multi Location Trials, Operational Research Projects, Lab to Land Programme, Popularising Prototypes, Farm Advisory Work and Feed Back work to the research wing about the farmers' requirements besides helping the Training & Visit staff in the monthly zonal workshops. *These Krishi Vigyan Kendras* are functioning as out-posts of Tamil Nadu Agricultural University for dissemination of TNAU innovation The extension education activities of the Krishi Vigyan Kendras are given below.

Achievements of Krishi Vigyan Kendras During 1983-84

Activities	Coimbatore	Pondicherry	Madurai	Trichy	Total
On campus training	12	106	18	55	191
Off-campus training	12	99	13	14	138
Multi-location trials	35	52	31	15	133
Compact block demonstration	9	-	-	-	9
Method demonstration	55	60	56	54	225
Result demonstration	113	34	34	53	234
Demonstration farm	1	-	1	1	3
Farm days	7	4	5	2	18
Field days	5	7	5	4	21
Farmers' days	1	-	1	1	3
Village exhibition	5	15	5	12	37
Bio gas construction meeting	10	8	10	21	49
Farm Advisory service	89	130	71	30	320
Publication of literature	6	5	1	17	29
Writing to radio	77	33	41	33	184
Writing to dailies	50	27	48	23	148

5) Plant Clinic Centres

The three Plant Clinic Centres continued to function at Vellore, Kancheepuram and Tirunelveli. Scientists in these centres periodically visited different holdings, identified the pest and disease problems and suggested suitable solution control measures. They also arranged for mass ground spraying whenever necessary. These centres disseminated the TNAU innovations through All India Radio and Press. The details of the activities of the Plant Clinic Centres are presented below.

Achievements of Plant Clinic Centres During 1983-84

Activities	Vellore	Tirunelveli	Kancheepuram	Total
On-campus training	22	54	—	76
Multilocation trials	6	46	—	52
Compact block demonstration	1	—	2	3
Farm Advisory Service	396	287	291	974
Publication of literature	18	—	—	18
Writing to Radio	15	21	16	52
Writing to dailies	37	15	25	77

6) Communication Centre

i) Distance Learning Programmes

The following Distance Learning Programmes were offered by the University during this year.

a) Cassette Lessons

A new technique of distance learning namely 'Cassette Recorded Lessons' has been developed during this year. Unlike other programmes, the cassette lessons enable even illiterates to hear and learn the agricultural know-how. During this year, two cassette lessons on sericulture and coconut cultivation have been prepared and distributed to 150 farmers on cost basis.

b) Farm School on All India Radio

In this programme, courses on Farm forestry, bio-fertilizers, integrated pest management, moringa cultivation were conducted during the period under report. So far, 49 subjects in agriculture, horticulture, agricultural engineering, etc., have been covered and totally 7348 farmers got benefitted by these courses.

c) Correspondence Course

Under the correspondence course programme, so far 20 subjects have been covered benfitting 5715 farmers. During this year, courses on sugarcane cultivation, sericulture, banana cultivation, poultry farming, seed production, dairy farming and vegetable cultivation were conducted.

d) Television programme

A total number of 48 lessons on various subjects was telecast through 'Vayalum Vazhvum' programme of Doordarshan. The details are given below :

Name of subject	No. of lessons
Cotton (irrigated)	4
Pulses	4
Millets	4
Paddy	4
Groundnut (rainfed)	4
Vegetables	4
Paddy	4
Sugarcane	4
Banana	4
Paddy	8
Groundnut (irrigated)	4

On every Monday, programmes on Veterinary Sciences have been fixed to be telecast for the benefit of city dwellers as well as all farmers in the neighbouring districts.

ii) **Dissemination**

The communication centre disseminated 171 research findings through newspapers and journals. About 9890 querries of farmers relating to varieties, practices and other problems were clarified.

About 52 programmes on "Meet the Scientist", 60 programmes on "Scientist Talks" and 120 announcements were given through AIR.

iii) **Publications**

In Tamil 22 folders, 27 books and eight booklets were published. 'Valarum Velanmai' a Tamil monthly journal with 16000 subscribers and 'TNAU Newsletter' with 1000 circulation are being regularly published. 'Kalnadaikadir' from Madras Veterinary College and 'Uzhavar Thunaivan' from Agricultural College and Research Institute, Madurai are the other publications.

A 'Communication Centre' has been established at Madras Veterinary College, Madras.

7) **Exhibitions**

A total number of 5943 farmers of Tamil Nadu and 1468 farmers from other States visited the Central Exhibition of Tamil Nadu Agricultural University, Coimbatore. The University has participated in the district exhibition at Coimbatore and 'All India Tourist and Industrial Fair' at Madras. Through these exhibitions, more than five lakh people were benefitted. Further, 37 village exhibitions were conducted by the Krishi Vigyan Kendras.

8) **I.R.T.P.O. Scheme**

The IRTPO scheme extension centres were functioning at Vridhachalam and Kovilpatti upto March 1984. They undertook extension activities relating to pulses and oilseeds. They have conducted 16 training programmes, 79 group meetings, 40 field visits, 20 method demonstrations, 16 film shows cum exhibitions and one acre demonstration in TMV 3 gingelly. They have also given wide publicity about TNAU findings through radio and press and conducted seven Adaptive/Multilocation trials.

9) **Scheme for upliftment of Scheduled Caste & Other Backward Classes**

The above ICAR Scheme at Arupukkottai has been launched as a pilot project. Villages having more than 50% of Scheduled Caste population were selected under this scheme.

The appropriate technologies were identified to improve the standard of living of target groups and they were trained adequately to adopt the proven technologies.

Soil testing was arranged for 200 Scheduled Caste farmers. Training on tailoring was given to 50 scheduled caste women. Three hundred farmers were supplied with vegetable seeds and 45 farmers with IR 50 paddy seeds.

10) **National Demonstration Scheme**

National Demonstration Scheme functioning at Vellore, North Arcot District laid out ten rainfed demonstrations, nine multiple cropping demonstrations, five entire farming system demonstrations and one problem soil demonstration. The demonstrations were laid out by Scientists in selected farmers' holdings to show the worth of TNAU innovations for the benefit of farmers. Altogether, 60 field days were conducted in which 1773 farmers took part. Three folders were prepared and distributed to the farmers. Sixty popular articles were published. Regular messages were given through All India Radio and a television programme was also given by the team leader on 'National Demonstration-a medium for transfer of technology'.

11) **Multi-location Trial and Adaptive Research Trial**

Promising cultures in various crops selected in consultation with the concerned breeders are evaluated in farmers' fields by (i) the TNAU Scientists (MLT II) and (ii) by the Extension Officers of the State Departments of Agriculture, Oilseeds and Horticulture (ART).

The results of ART trials so far received were processed and brought out as a booklet.

12) **Breeder Seed Production Programme**

During 1983-84 the following quantities of breeder seeds were produced by the TNAU and supplied to the Departments of Agriculture Oilseeds and Horticulture for further multiplication

Crop	Production and supply (kg)
Paddy	12,640
Millets	920
Pulses	24,446
Cotton	2,880
Groundnut	33,100
Soybean	8,500
Sesamum	50
Vegetable crops	304
Sugarcane	61,000

Animal Husbandry Extension

The Department of Extension Education of the Madras Veterinary College functioned as an effective link between the Veterinary Research Workers and the State Animal Husbandry Department officials and farming community.

Modern animal husbandry technology and useful research findings were passed on to the farming community through mass media like All India Radio, Door Dharshan Khendra, Journals, extension workers, Correspondence courses and personal contacts etc.

The communication centre published 'Cheiron' a bimonthly scientific English journal and a popular journal in Tamil 'Kalnadai Kadir' besides a number of folders.

Farm School on All India Radio

A one - month course on "Sheep Rearing" was offered to 50 farmers.

A one day contact programme was also arranged at the Livestock Research Station, Kattupakkam.

Correspondence Course

Two courses entitled "Feeds and Fodder crops" and "Dairy Products" were offered and 26 farmers were benefitted.

Lab to Land Programme

The farmers of the selected Hasthinapuram village were educated to keep poultry farm in scientific methods.

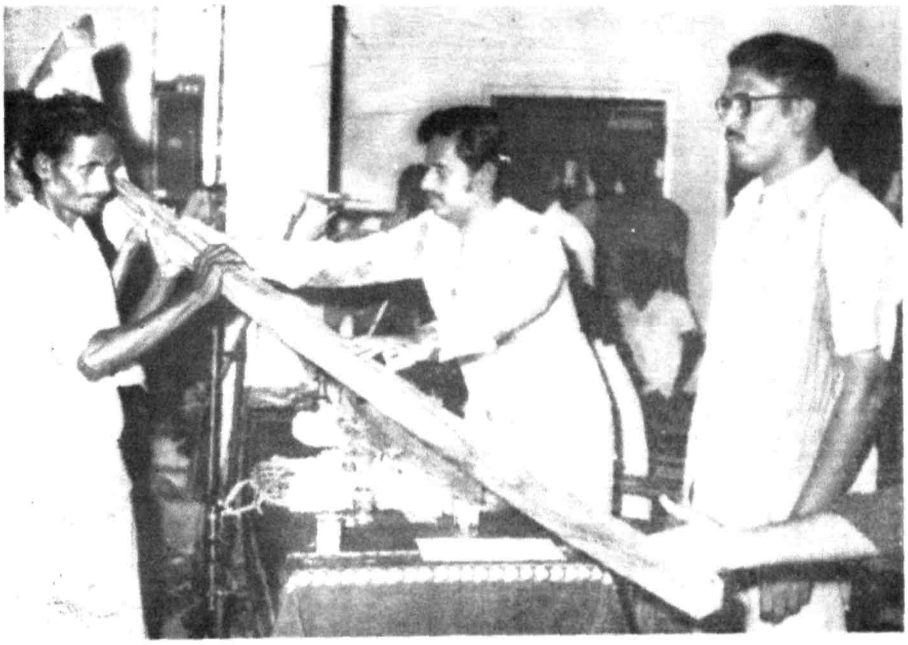
Others

The Farmers Training Centre at Pudukkottai conducted courses on dairy technology, Poultry and goat rearing and a total of 424 farmers were benefitted. The Poultry Research and Development Centres and Livestock Research and Development Centres situated in different parts of the State disseminated the new technologies in an effective manner.

The Vice-Chancellor at an exhibition put up in connection with the release of the Paddy Variety Py 3 at Pondicherry

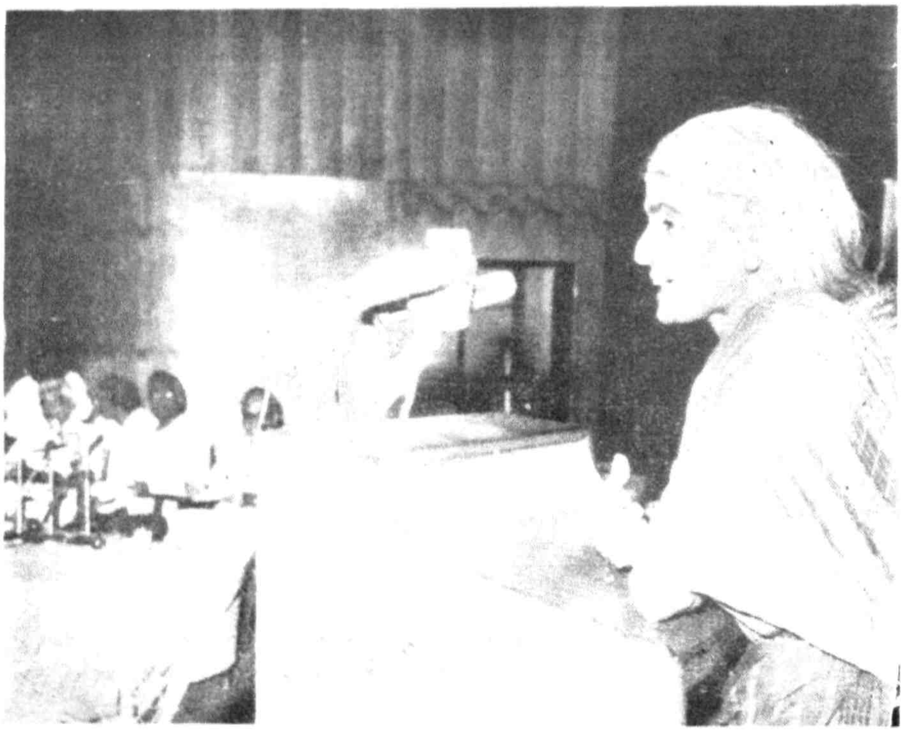
Thiru U. S. Natarajan, I.A.S., Director of Agriculture, Madras and the Vice-Chancellor at the Farmers' Day at T.R.R.I., Aduthurai

On-campus training in fruit preservation at Coimbatore



Thiru Sivakumar, Hon'ble Minister for Agriculture, Pondicherry State distributing improved implements to landless agricultural labourers under the Lab to Land Programme

Lab to Land farmers inspecting Co 4 Cowpea

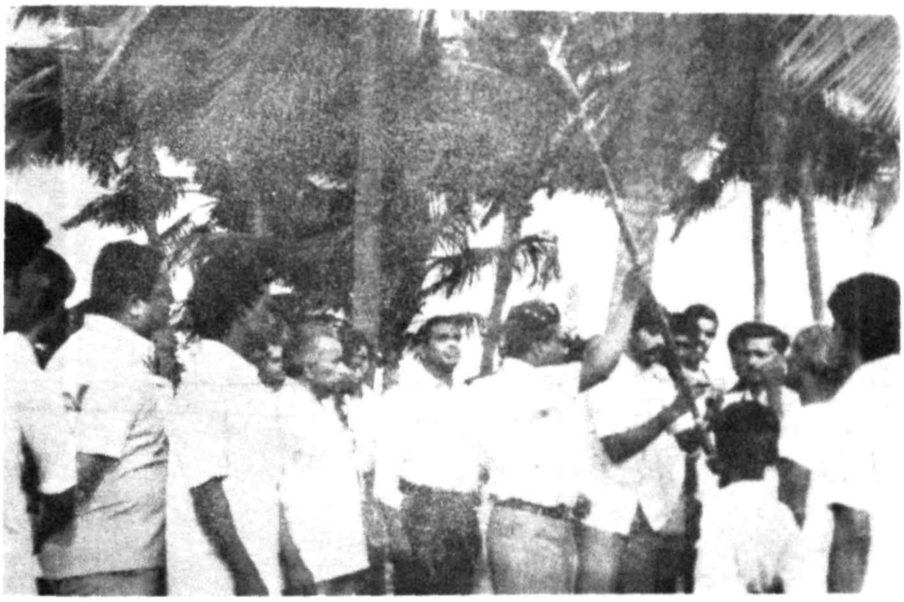


A lady farmer addressing a farmers discussion group at Coimbatore

The Director of Extension Education distributing agricultural inputs to farmers of Pondicherry State under Lab to Land Programme

Salient features of Co 1 Gingelly being explained to farmers of Pondicherry

Women participants undergoing Home Science training at Coimbatore



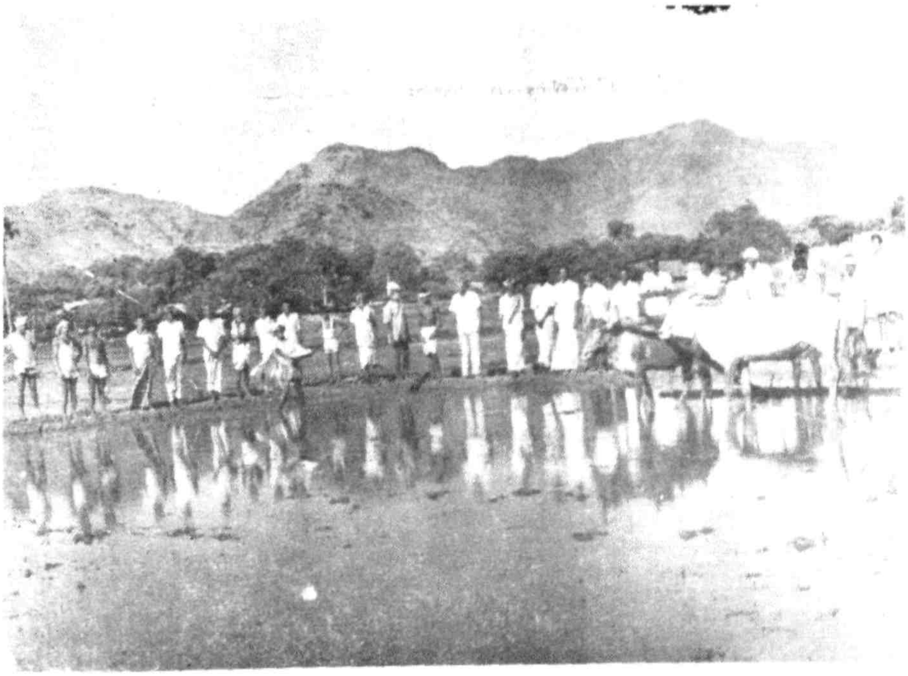
Method Demonstration of High Lance Duster

Inauguration of the Learning by Doing training for farmers by the Vice-Chancellor

Compact Demonstration Plot of CR 1009 Paddy

Compact Block Demonstration of Co 44 Paddy at Pondicherry

The Vice-Chancellor inaugurating Skill Demonstration by Farmers Discussion Group at Coimbatore



Field Demonstration of urea-gypsum application at Ayyampatti village of Coimbatore

ANNEXURE

CIVIL WORKS COMPLETED IN 1983 - 84

Main Campus, Coimbatore

1) Generator room
2) Store-cum office for Engineer-equipment
3) Layer house with cages for 2000 birds
4) Chick house
5) Deep litter layer house for 500 layers
6) Horticulture net house
7) Vehicle shed
8) Pavement around College of Agricultural Engineering
9) Flooring in Agricultural Engineering Workshop
10) Farmers' hostel.

Madurai Campus

1) Womens' hostel
2) P. G. hostel.

Madras Campus

Teachers' Hostel

Fisheries College, Tuticorin

1) Staff quarters (Teaching Staff)
2) Staff quarters (Basic Servants)

Agricultural Research Station, Aliyarnagar

1) Farm shed
2) Criple cleaner room

Agricultural Research Station, Bhavanisagar

Staff quarters

Horticultural Research Station, Yercaud

Staff quarters

Mecheri Sheep Research Station, Pottaneri

Five sheep sheds

Regional Research Station, Paiyur

1) Rat proof godown
2) Implement shed
3) Vehicle shed
4) Eight staff quarters
5) External water supply arrangements

Tamil Nadu Rice Research Institute, Aduthurai

Threshing floor

Kumaraperumal Farm Science Centre, Trichy

Threshing floor

National Pulses Research Centre, Pudukkottai

Threshing floor,

APPENDIX-I

LIST OF SCHEMES

University Research Schemes - Non-Plan

		1983-84 Revised Estimate (Rupees)
1.	Scheme for Improvement of Groundnut Through Induction of Mutation, Coimbatore.	64,000
2.	Scheme for Surveillance of Pests and Diseases, Vellore.	81,500
3.	Scheme for Studies on the Residues of Pesticides in Plant and Soil, Coimbatore.	1,59,900
4	Scheme for Establishment of Research Wing for Rodent Control in Delta Areas, Aduthurai.	2,100
5.	Scheme for Research on Citrus Die-back, Tenkasi.	83,700
6.	Scheme for Research on Citrus Die-back, Coimbatore.	20 000
7.	Scheme for Intensification of Pulses Research, Vamban.	46,900
8.	Scheme for Improvement of Redgram and Soybean, Vamban.	75,600
9.	Scheme for Evolution of Cumbu Resistant to Green Ear, Vamban.	98,300
10.	Scheme for Evolution of Cumbu Resistant to Green Ear, Kovilpatti.	1,01,400
11.	Scheme for Maximisation of Pulses Production, Vamban.	83,900
12.	Scheme for Improvement of Millets for Grain and Fodder, Kovilpatti.	1,03,800
13.	Scheme for Improvement of Sunflower in Tamil Nadu, Kovilpatti.	1,50,100
14.	Scheme for Improvement of Wetland Pulses, Aduthurai.	1,05,500
15.	Scheme for Coordinated Agronomic Experiment on Sugarcane, Villupuram.	2,27,100
16.	Scheme for Coordinated Agronomic Experiment on Sugarcane, Trichy.	2,67,000
17.	Scheme for Research on Nematode Parasites of Sugarcane Crop, Cuddalore.	1,21 400
18.	Scheme for Biological Testing of Pesticides Laboratory, Vamban.	25 500
19.	Scheme for Biological Testing of Pesticides Laboratory, Kovilpatti	42,000

20.	Scheme for Biological Testing of Pesticides Laboratory, Aduthurai.	72,900
21.	Scheme for Biological Testing of Pesticides Laboratory, Tindivanam.	47,300

University Research Schemes - Plan

22.	Scheme for Biological Control of Crop Pests, Coimbatore.	42,800
23.	Scheme for Breeder Seed Increase, Bhavanisagar.	1,96,000
24.	Scheme for Studies on Standardisation of Seed Production and Seed Storage Techniques in Tropical Vegetables, Bhavanisagar.	75,700
25.	Scheme for Studies on Standardisation of Seed Production and Seed Storage Techniques in Tropical Vegetables, Coimbatore.	43,200
26.	Scheme for Genetics Potential of Rice Dwarfs, Coimbatore.	33,800
27.	Scheme for Establishment of Foliar Diagnosis Laboratory, Coimbatore.	45,500
28.	Regional Research Station, Aruppukkottai.	4,49,000
29.	National Pulses Research Centre, Pudukkottai.	2,17,900
30.	Scheme for Improvement of Chrysanthemum and Marigold for Fresh Flower Trade, Madurai.	24,200
31.	Scheme for Research on Heterosis Breeding in Vegetable Crops, Coimbatore.	26,600
32.	Scheme for Strengthening of Coordinated Rice Entomological Research, Coimbatore.	1,24,900
33.	Scheme for Strengthening of Coordinated Rice Entomological Research, Madurai.	55,900
34	Scheme for Strengthening of Coordinated Rice Entomological Research, Regional Research Station, Paiyur.	5,000
35.	Scheme for Strengthening of Coordinated Rice Entomological Research, Aduthurai.	5000
36.	Scheme for Establishment of Plant Clinic Centre, Vellore.	1,05,100
37.	Scheme for Establishment of Plant Clinic Centre, Tirunelveli.	58,800
38.	Scheme for Establishment of Plant Clinic Centre, Kancheepuram.	42,700
39.	Scheme for Development of Sugarcane Varieties Suitable for Southern Districts of Tamil Nadu, Madurai.	82,800
40.	Scheme for Techno-Economic Survey of the Different Districts of Tamil Nadu, Madurai.	91,600
41.	Scheme for Development of Hybrid Rice, Coimbatore.	20,800
42.	Scheme for the Development of the Rice Varieties Suitable for Periyar-Vaigai River Project Area, Madurai.	99,600

43.	Scheme for Research on Temperate Vegetables, Sandynallah.	36,400
44.	Scheme for Research on Temperate Vegetables, Kodaikanal.	35,600
45.	Scheme for Research on Temperate Vegetables, Thadiyankudisai.	25,300
46.	Scheme for Establishment of Regional Laboratory, Trichy.	1,11,300
47.	Scheme for Establishment of Regional Laboratory, Paiyur.	1,11,100
48.	Banana Research Station, Vellore.	2,91,600
49.	Scheme for Strengthening and Coordinating Rice Virus Diseases and Mycoplasma Diseases, Coimbatore.	35,400
50.	Scheme for Strengthening and Coordinating Rice Virus Diseases and Mycoplasma Diseases, Madurai.	1,02,100
51.	Scheme for Research on Bunchy Top Virus Diseases, Thadiyankudisai.	41,700
52.	Scheme for Research on Improvement of Chillies in the Southern Districts of Tamil Nadu, Paramakudi.	1,12,800
53.	Scheme for Research on Potato Virus Disease, Sandynallah.	27,000
54.	Scheme for Establishment of a Horticultural Complex, Kattupakkam.	1,10,500
55.	Scheme for Research on the Improvement of Cultivation of Palmyrah Palm, Srivilliputhur.	1,86,500
56.	Turmeric Research Scheme, Agrl Research Station, Bhavanisagar.	73,500
57.	Scheme for Synthesising high yielding, Superior Quality and short duration interspecific and intra-specific hybrid cotton for rainfed and irrigation tracts of Tamil Nadu, Kovilpatti.	16,600
58.	Scheme for Operational Research Project for the control of Betelvine Wilt Disease in Coimbatore District, Kaniyur Centre, Aliyarnagar.	
59.	Scheme for Research on Dryland Forage Crops of Black Soil Regions of Tamil Nadu, Palani.	
60.	Scheme for Improvement of Edward Rose and Red Rose, Coimbatore.	14,100
61.	Scheme for the Development of Economical Roofing Materials, Coimbatore.	28,400
62.	Scheme for the Operational Research Project on Efficient Water Management Practices in Tankfed Areas, Kancheepuram.	50,600
63.	Scheme for the Operational Research Project on Efficient Water Management Practices in Tankfed Areas, Aruppukkottai.	61,300
64.	Schems for Development of Crop Pattern for Different Agro-climatic Zones, Coimbatore.	1,28,900
65.	Scheme for Development of Crop Pattern for Different Agro-Climatic Zones, Vellore.	60,300
66.	Scheme for Development of Crop Pattern for Different Agro-Climatic Zones, Tirunelveli.	56,900
67.	Scheme for Development of Crop Pattern for Different Agro-Climatic Zones, Paiyur.	59,200
68.	Scheme for Establisement of Seed Technology Unit, Madurai.	1,07,600

69.	Krishi Vigyan Kendra, Coimbatore.	3,29,000
70.	Krishi Vigyan Kendra, Madurai.	2,76,700
71.	Scheme for the Hybrid Development by Mass Production of Haploid and Homozygous Plants in Hybrid Rice and Sorghum by Anther and Pollen Culture, Coimbatore.	66,800
72.	Scheme for the Intensification of Research on Medium Staple Cotton Types, Srivilliputhur.	83,300
73.	Scheme for the Intensification of Research on Medium Staple Cotton Types, Kovilpatti.	49,600
74.	Scheme for the Intensification of Research on Medium Staple Cotton Types, Paiyur.	41,800
75.	Scheme for M Sc Course in Plant Nematology, Coimbatore.	1,000
76.	Scheme for Establishment of a Centre for Sericulture, Coimbatore.	1,14,200
77.	Scheme for Starting of Post-Graduate Diploma in Plant Protection, Coimbatore	1,63,900
78	Strengthening of Research Stations under National Agricultural Research Project.	2,00,000
79.	Scheme for Evolution of High Yielding Crop Varieties Suitable for Lower Bhavani Project Area, Bhavanisagar.	48,500
80.	Scheme for Starting of Post-graduate Diploma in Horticulture (Plantation Crops Ornamental Gardening), Thadiyankudisai.	1,26,100
81.	Scheme for Strengthening Research on Chemistry of Submerged Soils of Thanjavur District, Aduthurai.	43,200
82.	Scheme for Establishment of Regional Laboratory, Yercaud.	98,400
83.	Scheme for Studies on the Nutritive Value of New Varieties and their changes due to Modern Agricultural and Processing Technology, Coimbatore.	24,400
84.	Scheme for Research on Introduction of New Tree Species in Tamil Nadu, Coimbatore.	50,800
85	Scheme for Research on Introduction of New Tree Species in Tamil Nadu, Vellore.	10,100
86.	Scheme for Research on Introduction of New Tree Species in Tamil Nadu, Pudukkottai.	17,000
87.	Scheme for Research on Introduction of New Tree Species in Tamil Nadu, Tirunelveli.	9,800
88.	Scheme for Vegetable Seed Production, Palur.	66,500
89.	Scheme for Popularisation of Agricultural Implements Through Krishi Vigyan Kendra, Coimbatore.	38,700
90.	Scheme for Popularisarion of Agricultural Implements Through Krishi Vigyan Kendra, Madurai.	43,400

91.	Scheme for Evolution of Medium Staple Cotton Suitable for Black Soil Rainfed Tracts of Southern Districts, Kovilpatti.	37,200
92.	Scheme for Establishment of a Unit for Conducting Research Studies in Mycotoxin. Coimbatore.	82,300
93.	Scheme for Evolution of Forage Crops Suited to the Milk Shed Areas of North Eastern Districts of Tamil Nadu, Vellore.	56 500
94.	Scheme for Improvement of Minor Pulses and Synthesising Hybrid Varieties of Sesamum, Coimbatore.	75,200
95.	Scheme for Developing suitable sprayer for Spraying Tall Trees, Coimbatore.	2,400
96.	Scheme for Studies on the Indigenous Pesticides of Plant Origin, Coimbatore.	18'100
97.	Scheme for Establishment of Rural Observatory Coimbatore.	51,000
98.	Scheme for Seed Production and Seed Storage Studies in Sub-tropical and Temperate Crops, Periyakulam.	1,17,200
99.	Scheme for Improvement of Groundnut Suitable for Rainfed Area, Tindivanam.	43,500
100.	Project on Integrated Inter-disciplinary Collaboration Research on Sorghum, Coimbatore.	65,500
101.	Scheme for Genetic Improvement of Honey Bee, Yercaud.	61,200
102.	Scheme for Integrated Weed Management in Different Cropping System, Vridhachalam.	19,100
103.	Scheme for Integrated Weed Management in Different Cropping System, Kovilpatti.	22,600
104.	Scheme for Integrated Weed Management in Different Cropping System, Aduthurai.	19,100
105.	Scheme for Strengthening the Post-graduate Teaching and Research in Agrl. Marketing Management, Coimbatore.	40,500
106.	Scheme for the Development of Suitable Varieties of Sweet Potato and Tapioca for Ethenol Production, Coimbatore,	44,900
107.	Scheme for improvement of Forage Grasses, Legumes and Pasture Development, Aruppukkottai.	60,500
108.	Scheme for Improvement of Forage Grasses, Legumes and Pasture Development, Paiyur.	60,500
109.	Scheme for Improvement of Forage Grasses, Legumes and Pasture Development, Erode.	60,500
110.	Scheme for Research on Oil Bearing Tree Crops like Neem, Pungam and Silvagronomical Studies on Energy Fuel Yielding Wood Lots at Aruppukkottai.	32,500
111.	Scheme for Research on Oil Bearing Tree Crops like Neem, Pungam and Silvagronomical Studies on Energy Fuel Yielding Wood lots at Mettupalayam.	32,500

112.	Improvement of Existing Downy Mildew Resistant Varieties (Maize) for Yield and Resistability to Rainfed Farming System of Tamil Nadu, Coimbatore.	46,300
113.	Scheme for the Formulation of improved Agro-Techniques in Grapes Suitable for Dharmapuri District, Paiyur.	31,500
114.	Establishment of a Centre for Nematode Pests of Crop Plants, Madurai.	29,500
115.	Scheme for the Improvement of Brinjal Varieties for North-East Region of Tamil Nadu, Palur.	16,000
116.	Studies on the Causes of Low Soil Fertility in Chingleput District, Tirur.	40,500
117.	Establishment of a Seed Complex Including Seed Health Testing Training Centre, Bhavanisagar.	94,000
118.	Scheme for Agro Processing of Millet Based Food Products at Village level, Coimbatore.	25,000
119.	Scheme for Strengthening of Seed Production Programme at Multi crop Experiment Station, Pattukkottai.	15,000
120	Scheme for Starting of Bio-fertilizer Production and Quality Control Unit, Coimbatore.	25,700
121.	Scheme for Starting of Bio-fertilizer Production and Quality Control Unit. Madurai.	23,700
122.	Scheme for Operational Research Project for Dryland Technology at Manapparai and Ariyalur in Tiruchi District.	1,500
123.	Scheme for Studies on Wilt and Button Shedding in Coconut, Nagercoil.	74,200
124	Scheme for Improvement of Sunflower, Tindivanam	1,00,800
125.	Scheme for Development of Breeders Seed of Millets, Kovilpatti.	67,500
126.	Scheme for Development of Breeders Seed of Millets, Vamban.	29,800
127.	Establishment of Nematology Laboratory, Kancheepuram.	1,82,900
128.	Establishment of Nematology Laboratory, Trichy.	1,74,100
129	Establishment of Biological Testing Laboratory, Paiyur.	99,300
130.	Scheme for Production of Breeders Seed in Paddy, Aduthurai.	67,000
131.	Scheme for Improvement of Manja Makkattai and Thalaivirichan Cholam, Vamban.	71,500
132	Scheme for Upgrading the Sugarcane Experiment Station, Cuddalore.	1,51,700
133	Scheme for Strengthening of Multi crop Experiment Station, Palur.	47,900
134.	Scheme for Multiplication and Distribution of Pulses, Vamban.	1,69,800

135.	Livestock Research Station, Kattupakkam	28,70,400
136.	Farmers' Training Centre, Pudukkottai.	1,04,300
137.	Mecheri Sheep Research Station, Pottaneri.	1,56,600
138.	Pasture Development Research Project, Pottaneri.	1,07,700
139.	Scheme for Genetic Improvement of Mutton Sheep Breed, Kattupakkam.	1,25,200
140.	University Coordinated Research Project on Fodder Crops, Coimbatore.	51,500
141.	University Coordinated Research Project on Fodder Crops, Kattupakkam.	66,100
142.	University Coordinated Research Project on Fodder Crops, Sandynallah.	19,400
143.	Starting of Ph. D. Programme in Pharmacology, Madras.	1.05.700
144.	Starting of Ph. D. Programme in Obstetrics and Gynaecology, Madras.	43,300
145.	Department of Animal Disease Investigation and Control, Madras.	2,88,300
146.	Department of Clinics, Madras.	11,20,900
147.	'Cheiron' Making it as Bi-monthly Journal, Madras.	30,600
148.	Scheme for Establishment of Radio Isotope Laboratory and Trace Mineral Nutrition, Madras.	4,54.400
149.	Poultry Research and Development Centre, Namakkal	1,42,000
150.	Farmers' Training Centre. Kattupakkam.	1,59,300
151.	Scheme for the Establishment of Quality Control and Service Division of Animal Feeds, Madras	1,20,800
152.	Poultry Research and Development Centre, Madurai.	1,22,900
153.	Poultry Research and Development Centre, Rajapalayam.	1,07,400
154.	Poultry Research and Development Centre, Trichy.	1,82,300
155.	Livestock Research and Development Centre, Tirunelveli.	1,71,400
156.	Livestock Research and Development Centre, Erode.	1,66,100
157.	Livestock Research and Development Centre, Dharmapuri.	1,58,400
158.	Scheme for Strengthening of Bio-chemistry section for Research and Teaching of Post-graduate studies	32,200
159.	Scheme for starting of Ph D. Programme in Therapeutics, Madras.	1,59,100
160.	Livestock Research and Development Centre Nagercoil.	1,77,100
161.	Poultry Research and Development Centre, Tirupur.	1,34,400
162.	Poultry Research and Development Centre. Vellore.	1,51,000

163.	Scheme for Research on Tropical Bovine Theileriasis, Madras.	2,00,100
164.	Scheme for Influence of Aflotoxicosis on the Immune response of Cattle Protected Against Rinderpest, Madras.	1,02,200
165	Directorate of Animal Health, Madras.	1,95,800
166	Establishment of Poultry Production Training Centre, Madurai.	86,800
167.	Scheme for Establishment of Entomology Research Unit, Madras.	1,21,600
168	Poultry Research and Development Centre, Pudukkottai.	1,39,100
169.	Scheme for Enrichment of Poor Quality Cellulosic Waste and Pelletting for Maintenance of Work Bullocks and Cows Yielding Less Than Five Litres of Milk, Coimbatore.	72,000
170.	Scheme for Enrichment of Poor Quality Cellulosic Waste and Pelletting for Maintenance of Work Bullocks and Cows Yielding Less Than Five Litres of Milk, Kattupakkam.	50,100
171.	Scheme for the Control of Abortion in Cattle, Erode.	82,900
172.	Scheme for the Control of Abortion in Cattle, Coimbatore.	71,700
173.	Scheme for the Control of Abortion in Cattle, Trichy.	1,15,500
174.	Scheme for Strengthening the Department of Animal Husbandry, Madurai.	48,700
175.	Establishment of Institute of Animal Nutrition, Kattupakkam.	3,35,600
176.	Scheme for Research Project on Electron Microscopial and Ultra Structural Studies on Rhinosporidiasis in Nasal Polyps of Animals and Man, Veterinary College, Madras.	1,30,000
177.	Scheme for Starting of Ph. D. Programme in Veterinary Pathology, Madras.	33,300
178.	Scheme for Starting of Ph. D. Programme in Preventive Medicine, Madras.	1,40,100
179.	Scheme for Evolving Broiler Rabbit, Sheep Breeding Research Station, Sandynallah.	34,000
180.	Scheme for Breeding Ducks for Egg, Madras.	34,000
181.	Scheme for Conducting Short Term Training Course in the Dept. of Meats, Madras.	34,000
182.	Scheme for Organisation of the Dairy Plant at the Dept. of Dairy Science, Madras.	6,00,000
183.	Scheme for Karyology of Cattle and Buffalo Chromosomes with Particular Reference to Sterility and Infertility, Madras.	14,000

84.	Scheme for Establishment of Vaccine Research Centre, Madras.	92,300
185.	Scheme for Studies on Tropical Bovine Theileriasis (Acarology), Madras.	24,000

Fishery Science - Plan Schemes

186.	Scheme for Culture of Brime Shrimp *Artenia Sabina*, Tuticorin	45,400
187.	Scheme for Pollution Monitoring Studies in Tuticorin Waters, Tuticorin.	28,300
188.	Scheme for Mariculture of Fishes, Tuticorin.	41,400
189.	Scheme for Brackish Water Pen Culture, Tuticorin.	35,000
190.	Scheme for Operational Research Project on Fish Culture, Killikulam	36,700
191.	Scheme for Operational Research Project on Fish Culture, Aduthurai	23,000
192.	Scheme for Operational Research Project on Fish Culture, Madurai.	21,300
193.	Starting of M. F. Sc. Course, Tuticorin.	84,900
194.	Scheme for Polyculture of Fin Fishes and Shell Fishes in Brakish Water.	73,500
195.	Scheme for Establishment of Mariculture Research Station, Ennore	67,500

I. C. A. R. Schemes - Fully Financed

1.	Scheme for Strengthening of Post-Graduate Departments-Establishment of New Departments, Division of Food Sciences, Coimbatore.	52,500
2.	Instructional Scheme Unit of Duck, Kattupakkam	15,000
3.	Scheme for Establishment of a New Wing for Research and Teaching on Veterinary Public Health and Epidemiology, Madras.	84,200
4.	Scheme for Influence of Climate on Ontogenic changes in Determining Evapotranspiration and Biomass Production in Sugarcane, Cuddalore.	37,100
5.	Scheme for Production of Super Elite and Elite Sunflower Seed, Bhavanisagar.	4,31,100
6.	IDRC Research Project on Sesamum. Vridhachalam.	1,43,300
7.	Intensification of Research and Training in Pulses and Oilseeds Crops, Aduthurai.	1,73,200
8.	Intensification of Research and Training in Pulses and Oilseeds Crops, Kovilpatti.	1,23,100

9.	Intensification of Research and Training in Pulses and Oilseeds Crops, Vridhachalam	1,06,700
10.	Scheme for Improvement of Existing Downy Mildew Resistant Varieties (Maize) for yield and Suitability to Rainfed Farming System of Tamil Nadu. Coimbatore.	14,100
11.	Scheme for Development of Isogenic Non-Restoral Pearl Millet Lines varying in Sources for Genes for Resistance to Downy Mildew and Testing at Various Locations, Trichy.	15,500
12.	I. D. R. C. Research Project on Sesamum, Paiyur.	57,500
13.	I. D. R. C. Research Project on Sesamum, Srivilliputhur.	58,600
14.	Scheme far Studies on Biological Effect of Chitin Inhibitor on *Spodoptera litura* and *Heliothis armegera*, Coimbatore.	21,300
15.	Scheme for Studies on Management of Pulses *Heliothis armegera* and *Spodoptera litura*, Coimbatore.	21,300
16.	Scheme for All India Multilocational Research on Agrl. Acerology, Coimbatore.	38,300
17.	Scheme for White Tip Nematode of Rice, Nagercoil.	49,500
18.	All India Coordinated Research Project on Betelvine Disease, Velur.	66,600
19.	Scheme on the Control of Tomato Virus Disease by Antivirus Principles from Non-hosts, Coimbatore.	16,200
20.	Scheme for Research on Improvement of Pepper. Thadiyankudisai.	42,000
21.	Scheme for Research on Improvement of Tree species in Tamil Nadu, Thadiyankudisai.	40,200
22.	Coordinated Scheme on National Demonstration of Major Food Crops, Vellore.	1,35,300
23	Lab to Land Programme for Transfer of Technology to Farmers' Families. K. V. K. Coimbatore.	2,62,000
24.	Lab to Land Programme for Transfer of Technology to Farmers' Families, K V. K. Madurai	2,91,600
25.	Lab to Land Programme for Transfer of Technology to Farmers' Families. Kumara-Perumal Farm Science Centre, Trichy.	1,36,100
26.	Lab to Land Programme for Transfer of Technology to Farmers' Families, K.V K., Pondicherry.	2,16,000
27.	Lab to Land Programme for Transfer of Technology to Farmers' Families, Paiyur.	1,85,700
28.	Lab to Land Programme for Transfer of Technology to Farmers' Families, Vridhachalam.	2,81,500

29.	Lab to Land Programme for Transfer of Technology to Farmers' Families, Aduthurai.	1,87,000
30.	Off-season Avocational Interest and Opportunity in Farming Families, Coimbatore.	8,700
31.	All India Corrdinated Research Project for the Rapid Improvement of Agrl. Technology Directed at Socio-Economic Upliftment of Scheduled Caste and Other Backward Communities, Aruppukkottai.	2,35,800
32.	Scheme for Breeder Seeds, National Seed Production, Bhavanisagar.	6[illegible],600
33.	Scheme for Standardisation of Hybrid Seed Production Techniques in Sorghum and Bajra, Coimbatore.	49,100
34.	Project of Technical Cooperation Between the I. D. R. C Canada and the I. C A. R., New Delhi on Post - Harvest Technology, Coimbatore	1,21,900
35.	Scheme for Establishment of Water Technology Centre, Coimbatore.	26,52,400
36.	Scheme on Post-Harvest Technology of Paddy Project - I. Prevention of Losses and Desterioration of Quality in Rice Storage and Processing, Tiruvarur.	47,400
37.	Scheme on Post-Harvest Technology of Paddy Project - II. Protein Rich Flour From Germs and Polish Improvement of Conventional Units for Higher Outturn and Oil Rich bran, Tiruvarur.	38,900
38.	Coordinated Project for Research on Chemistry of Submerged Soils under Rice Cultivation in High Rainfall Areas, Aduthurai	1,02,500
39.	Adhoc Scheme for Studies on the Causes and Correlation of Chlorosis in Crops Like Sugarcane, Turmeric, Jasmine etc. Coimbatore.	22,300
40.	Soil Organic Matter Fraction with Reference to Supply of Nutrients, Coimbatore.	26,000
41.	Centre of Advanced Studies in Post-graduate Agricutural Micro-biology with FAO/UNDP/ICAR Assistance, Coimbatore.	4,17,100
42.	Scheme for Studies on the Fishery Biology and Culturability of Commercially Important Fresh Water Prawns *Macrobrachium idae*, Tuticorin.	25,500
43.	Krishi Vigyan Kendra, Tiruchirappalli.	2,65,000
44.	Krishi Vigyan Kendra, Pondicherry	8,79,900
45.	All India Coordinated Rice Improvement Project, Pondicherry.	[illegible],41,300

46.	Studies on Production and Marketing of pulses in Tamil Nadu, Coimbatore.	33,600
47.	Emeritus Scientist Scheme on Investigation on the Systematic and Biology of Croconometrics. Coimbatore.	17,400
48.	Scheme for Implementation of Administrative Sub-Project for Strengthening the Directorate of Research, Coimbatore.	1,82,300
49.	Scheme for Implementation of Research Sub-Project for Establishment of Special Centre for Cauvery Delta Zone, Trichy	4,43,500
50.	Strengthening of Regional Research Station, Paiyur.	17,29,500
51.	Scheme for Research Sub-Project for Establishment of Centre for Biological Research on Pulses, Coimbatore.	9,60,600
52.	Scheme for Implementation of Research Sub-Project for Strengthening of Regional Research Station, Vridhachalam.	14,47,100
53.	Scheme for Strengthening of Regional Research Station-Sub-Station, Tindivanam.	6,62,100
54.	Scheme for Strengthening of Regional Research Station, Kattupakkam.	3,88,100
55	Scheme for Strengthening of Regional Research Station, Cuddalore	7,06,400
56.	Scheme for Strengthening of Regional Research Station, Aruppukkottai.	22,27,200
57.	Scheme for Strengthening of Regional Research Station-sub-Centre, Vamban	9,79,000
58.	Scheme for Strenghthening of Regional Research Station-sub-Centre, Srivilliputhur	6,00,000
59.	Scheme for strengthening of Regional Research Station-sub-Centre, Thadiyankudisai.	14,65,000
60	Scheme for implementation of Research Sub-Project for Establishment of Regional Station, Aduthurai.	32,26,700

I.C.A.R. Schemes - Partly Financed

1.	Emeritus Scientist - Studies on aflotoxicosis in Laboratory Animals. Madras.	13,100
2.	Scheme for award of Apprenticeship Internship for Veterinary Graduates Trained by Agrl. University, Madras.	3,01,600
3	All India Coordinated Project for Strengthening Agricultural and Research Programme for the Socio-Economic Upliftment of Tribals - Tribal Area Research for Baffalo Base Farming in Nilgiris, Sandynallah.	2,86,200

4	Scheme for Utilisation of Tree Leaves as a Source of Fodder During Winter in Mountain Regions, Sandynallah.	29,700
5.	Evolving a Synthetic Anthor Breed of Sheep of Tamil Nadu, Mecheri Sheep Research Station, Pottaneri	1,47,300
6.	Integrated Scheme for Water Management and Soil Salinity, Bhavanisagar.	2,92,000
7.	All India Coordinated Agronomic Research Project Cropping System Research, Coimbatore.	1,91,400
8.	All India Coordinated Agronomic Research-Cropping System Research, Bhavanisagar.	86,200
9.	Integrated Scheme for Water Management and Soil Salinity, Madurai.	2,75,900
10.	All India Coordinated Research Project for the Improvement of Wheat, Coimbatore	62,600
11.	All India Coordinated Research Project for Dryland Agriculture, Kovilpatti.	38,300
12.	All India Coordinated Research Project on Sugarcane, Cuddalore.	49,500
13.	All India Coordinated Agronomic Research Project-Experiment on Cultivators' Field, Villupuram	1,74,900
14.	All India Coordinated Agronomic Research Project-Experiment on Cultivators' Field, Trichy.	1,74,000
15.	All India Coordinated Agronomic Research Project Experiment on Cultivators' Field, Salem	1,21,500
16.	All India Coordinated Agronomic Research Project Model Agronomic Experiments, Tanjore	1,00,700
17.	All India Coordinated Research Project on Oilseeds, Coimbatore.	8,31,500
18	All India Coordinated Research Project on Oilseeds Off-season Nursery Project, Aliyarnagar.	2,84,800
19.	All India Coordinated Research Project on Oilseeds, Main Centre for Groundnut, Vridhachalam.	2,57,700
20.	All India Coordinated Research Project on Oilseeds, Sub Centre for Castor Research, Tindivanam.	74,100
21.	All India Coordinated Rice Improvement Project, Coimbatore.	2,78,500
22.	All India Coordinated Rice Improvement Project, Aduthurai.	2,78,500
23.	All India Coordinated Rice Improvement Project, Madurai	24,900
24.	All India Coordinated Research Project for Improvement of Millets, Coimbatore.	2,12,600

25.	All India Coordinated Research Project for Improvement of Sorghum, Coimbatore	3,27,300
26.	All India Coordinated Research Project on Jute and Allied Fibres, Coimbatore.	46,100
27.	All India Coordinated Cotton Improvement Project, Coimbatore.	2,32,300
28.	All India Coordinated Cotton Improvement Project, Kovilpatti.	1,60,900
29.	All India Coordinated Cotton Improvement Project, Srivilliputhur.	3,01,000
30.	All India Coordinated Research Project for Intensification of Research on the Improvement of Pulses, Coimbatore.	4,85,900
31.	All India Coordinated Research Project for Intensification of Research on the Improvement of Pulses, Vamban.	4,16,400
32.	All India Coordinated Research Project on Soyabean, Coimbatore	48,500
33.	All India Coordinated Research Project on Forage Crops, Coimbatore.	2,07,800
34.	All India Coordinated Research Project on Nematode Pests and Their Control, Coimbatore.	1,45,600
35.	Scheme on Coordinated Research on Biological Nitrogen Fixation, Coimbatore.	1,09,800
36.	All India Coordinated Research Project on Seed Borne Diseases, Coimbatore.	42,000
37.	All India Coordinated Research Project on Tuber Crops (other than Potato), Coimbatore.	92,400
38.	All India Coordinated Vegetable Improvement Project (including Chillies), Coimbatore	2,36,300
39.	All India Coordinated Vegetable Improvement Project (including Chillies), Kovilpatti.	65,500
40.	All India Coordinated Fruit Improvement Project, Coimbatore.	3,65,200
41.	All India Coordinated Improvement Project for Medicinal and Aromatic Plants. Kodaikanal.	1,86,800
42.	All India Coordinated Spices and Cashewnut Improvement Project, Coimbatore.	93,500
43	All India Coordinated Spices and Cashewnut Improvement Project, Vridhachalam.	1,38,500
44.	All India Coordinated Coconut and Arecanut Improvement Project, Veppankulam.	4,58,000
45.	All India Coordinated Coconut and Arecanut Improvement Project, Coimbatore	44,000

46.	All India Coordinated Fruit Improvement Project, Periyakulam	1,99,530
47.	All India Coordinated Floriculture Improvement Project Coimbatore	1,46,000
48.	All India Coordinated Fruit Improvement Project, Aruppukkottai	1,31,500
49.	Scheme for Research on Cardamom, Yercaud	87,100
50.	All India Coordinated Research Programme on Post-Harvest Technology in Horticultural Crops. Periyakulam	3,60,500
51.	All India Coordinated Research Project on Under Utilised/Under Exploited Plants, Mettupalayam	53,900
52.	All India Coordinated Research Project on Agry-Forestry, Mettupalayam	3,15,00
53.	All India Coordinated Mushroom Improvement Project, Coimbatore	1,00,300
54.	Scheme for Studies on Harvest and Post-Harvest Technology, Coimbatore	2,85,400
55.	Scheme for Energy Requirements in Intensive Agricultural Production, Coimbatore	1,95,000
56.	All India Coordinated Scheme for Research and Development of Farm Implements, Machinery and Production of Proto-types and Their Evaluation Under Different Agro-Climatic Conditions, Coimbatore	5,15,300
57.	Scheme for Intensive Testing Power Tiller Research and Development of New Machines to Make Them Versatile, Coimbatore	86,900
58.	Scheme for All India Coordinated Research Project on Renewable Energy Sources for Agriculture and Agro based Industries, Coimbatore	4,04,000
59.	All India Coordinated Research Project on Long Term Fertilizer Experiments, Coimbatore	54,200
60.	All India Coordinated Scheme on Micro-nutrients of Soils, Coimbatore	1,83,600
61.	All India Coordinated Scheme for Studies on Measurement, Evaluation and Improvement of Soil Physical Conditions to Increase Agricultural Production of Problematic Areas, Coimbatore	2,01,400
62.	All India Coordinated Scheme for Investigation on Correlation of Soil Test with Crop Resonses, Coimbatore	2,14,800
63.	All India Coordinated Research Project on Composite Culture of Indian and Exotic Fishes and Fish Seed Production, Tuticorin	87,000

Government of India Schemes

1.	Comprehensive Scheme for Studying the Cost of Cultivation of Principal Crops in Tamil Nadu, Coimbatore	8,57,200
2.	Scheme for Establishment of Agro-Energy Centre at Tamil Nadu Agrl. University, Coimbatore	2,30,200

3.	Scheme for Setting up of Regional Centre for Development of Bio gas, Coimbatore	1,72,800
4.	Scheme for Integrated Recycling of Organic Wastes, Coimbatore	53,600
5.	Paddy Processing Research Centre, Tiruvarur	6,24,700
6.	Scheme for Development of Sugarcane, Melalathur	31,300
7.	Scheme for Development of Sugarcane, Sirugamani	33,500
8.	Scheme for Development of Sugarcane, Cuddalore	10,000
9.	Scheme for Intensive Cotton Development Programme, Kovilpatti	65,700
10.	Scheme for Intensive Cotton Development Programme, Bhavanisagar	40,600

Other Agencies

1.	Scheme on Methods for Improving Productivity in the Periyar-Vaigai Irrigation System, Madurai (Ford Foundation)	39,200
2.	Programme for Awarding Fellowship to Women Students to Pursue Post-graduate Studies in Agriculture, Coimbatore (Ford Foundation)	82,500
3.	IFPRI-Sponsored Collaborative Research on Growth linkage Effects of Green Revolution on Regional Income and Employment in Tamil Nadu, Coimbatore (Ford Foundation)	7,5 ,700
4.	Scheme for Training Women in Enterprise Management to Encourange their Participation in Rural Development, Coimbatore (Ford Foundation)	1,18,500
5.	Research Project on Fate and Efficiency of Urea Based Fertilizers in India, Coimbatore (PL. 480)	1,30,300
6.	Project on Changing Structure of Rural Employment and Factor Market in Tamil Nadu, Coimbatore (Ford Foundation)	80,100
7.	Study on the Role of Women in Rural Development, Tiruchirapalli (Ford Foundation)	57,100
8.	Scheme for Studies on the Influence of Ecological Disturbance on Water quality and the Impact Along Amaravathi River System, Coimbatore (UNESCO)	14,400
9.	Scheme for All India Coordinated Research Project on Weed Control, Coimbatore (PL. 480)	1,92,800
10.	Scheme for Land and Water Use Planning of Water Shed, Coimbatore (PL. 480)	71,800
11.	Scheme for Tree Improvement of *Eucalyptus tereticornis* (Mysore Gum), Mettupalayam (PL. 480)	69,100
12.	Scheme for Soil Conservation Measures for Dryland Based on Soil and Loss Equation, Coimbatore (PL. 480)	1,12,200

13.	Scheme of Mycorrhizal Association in Tropical Pines Grown in Nilgiris, Sandynallah, (IFS, Sweden)	19,500
14.	Scheme for Effect of Pesticides on the Metabolic Activities of Soil Micro-organisms, Coimbatore (International Atomic Energy Agency - Vienna)	23,800
15.	Scheme for Tree Improvement Programme (Forestry Research Station, Mettupalayam) (South India Viscose Limited and Seshasayee Paper Boards Limited)	1,31,600
16.	Scheme for Research on Integrated Control of *Prodenia litura* on Cotton and Chillies, Madurai (Hindustan Lever Limited, Bombay).	25,400
17.	Scheme for Testing of Chemicals, Mircro-nutrients, Insecticides etc., Madurai. (The Stanes and Company Ltd. Coimbatore)	5,000
18.	Studies on the Pouling Problem of Cooling Towers and its Control and on the Treatment Disposal and Utilisation of Effluents from the SPIC Factory, Tuticorin. (M/s. Southern Petro-Chemical Industries Corporation Limited, Madras)	2?,600
19.	Scheme for Studies on Comparative Performance of Ammonium Chloride as a Source of Nitrogen and its Effect on Soil Fertility, Madurai (Tuticorin Alkali Chemicals and Fertilizers Ltd., Madras)	54,800
20.	Scheme for Studies on the Comparative Performance of Ammonium Chloride as a Source of Nitrogen and its Effect of Soil Fertility, Sirugamani (Tuticorin Alkali Chemicals and Fertilizers Ltd., Madras)	42,800
21.	Scheme for Studies on the Comparative Performance of Ammonium Chloride as a Source of Nitragen and its Effect on Soil Fertility, Ambasamudram. (Tuticorin Alkali Chemicals and Fertilizers Ltd., Madras.)	46,700
22.	Scheme for Studies on Comparative Performance of Ammonium Chloride as a Source of Nitrogen and its Effect of Soil Fertility, Tirurkuppam. (Tuticorin Alkali Chemicals and Fertilizers Ltd., Madras.)	38,400
23.	National Scheme on Training of Rural Youth for Self Employment (TRYSEM), Coimbatore, Madurai and Trichy (Director of Agriculture, Madras.)	5,02,000
24.	Scheme for Pilot Project for Optimization of Resources used for Farm Development in Tamil Nadu (Director of Agriculture, Madras)	29,300
25.	Scheme for Evolution of Early maturing High Yielding Medium Staple Variety Cotton, Paiyur. (Sima-Cotton Development and Research, Association, Coimbatore).	79,200
26.	SIDA Aided Social Forestry in Dharmapuri and North Arcot Districts. (State Department of Forestry)	61,500

27	Scheme for Instalment of Nocil Film Technique, Coimbatore, (National Organic Chemical Industries, Madras)	1,500
28.	Scheme on Research Work on Preserving Neera, Improving the Flavour and Keeping Quality of Jaggery, Coimbatore (Khadi and Village Industries Board, Madras)	41,400
29.	Scheme for Institution of a Chair in Agrl. Marketing Management, Coimbatore. (State Agricultural Marketing Board, Maras)	54,200
30.	Training-cum Discussion Seminars under the Training and Visit System, Director of Extension Education, Coimbatore (Director of Agriculture, Madras)	58,800
31.	Short Term Training Programme to Range Officers, (State Dept of Forestry)	28,000
32.	Training for Asst. Conservator of Forests in Rural Extension Methods, Coimbatore (State Dept. of Forestry)	3,000
33	Training Programme in Horticultural Subject to three SriLanka Trainees, Coimbatore (F A O)	10,600
34.	Project on Expost Evaluation of Dug Well Investment in Hard Rock Area in Salem District. (ARDC)	60,000
35.	Study into Small Farmers Reach Down in Tamil Nadu under NABARD (ARDC) Lending-CARDS, Coimbatore (NABARD)	80,000
36.	Scheme for Strengthening Coffee Teaching and Training to the Under-Graduate and Post-Graduate Degree Course in Horticulture, Horticultural Research Station, Yercaud. (Coffee Board, Bangalore)	25,900
37.	Contingent grant for Research work by Pool Officer, Tamil Nadu Rice Research Institute, Aduthurai. (Scientist Pool)	4,000
38.	Scheme for Research on Medicinal and Aromatic Plants. (State Cinchona Department)	90,800
39.	Scheme for Research on the Control of Cinchona Disease, Sandynallah (State Cinchona Department)	31,200
40.	Hill Area Development Programme-Strengthening of Sheep Breeding Research Station, Sandynallah.	486,000

APPENDIX - II

LIST OF BOOKS AND BOOKLETS PUBLISHED

Books and Booklets in English

- i) Pest Management in Rice
- ii) Medical Management of Spinal Injury - A Case Report
- iii) Anaplasmosis in a Heifer - A Case Report
- iv) Decade of Post Harvest Technology
- v) Prefabricated on Farm Irrigation Structures
- vi) Improved Farm Implements and Processing Machinery
- vii) Maintenance of Tractors and Power Tillers
- viii) Integrated Farming Systems - An Experience and Case Study
- ix) Cropping System in the Tropics
- x) National Seminar on Cotton in Eighties
- xi) Genetic Analysis in *Sesamum indicum* L
- xii) Production Technology for Oyster Mushroom

Books and Booklets in Tamil

- i) கலப்புப்பண்ணை
- ii) வேளாண் நிலவரம்
- iii) முருங்கை சாகுபடி

APPENDIX - III

Research Papers Published in 1983-84

Agricultural Biochemistry

1. Balasaraswathi, R., 1982. Incidence of patulin in scented supari. *Madras Agri. J.*, 69 : 326 328.

2. Theymoli Balasubramanian and S. Sadasivam, 1983. Effect of temperature on biochemical compounds during storage of tomato fruits. *South Indian Hort.*, 31 : 89-94.

Agricultural Botany

1. Appadurai, R. and A. Amirthadevarathinam, 1984. Combining ability and heterosis in dry and semidry paddy. *Madras Agric. J.*, 70 (40) : 223-227.

2. Appadurai, R. and S. Krishnaswamy, 1983. Heterosis in homogygots. Precongress Meeting of the XV International Congress of Genetics. 7 9, Dec., 1983, TNAU, Coimbatore.

3. Appadurai, R. and S. Krishnaswamy, 1983. Plasmon effects in heterosis. Pre-Congress Meeting of XV International Congress of Genetics, 7-9, Dec, 1983, TNAU, Coimbatore.

4. Henry Louis, I., 1983. Heterosis in Coconut. International Genetic Congress, Abstract.

5. Manimekalai Gurunathan and S. R. Sree Rangasamy, 1983. Sexual propagation of azolla through sporocorp. *IRRN* 8 : 26-27.

6. Manimekalai Gurunathan and S. R. Sree Rangasamy, 1983. Another culture in rice. *IRRN* 8 (4) : 10-11.

7. Mohamed Sheriff, N. and A. Subramanian, 1983. Genctic analysis of yield and yield components in redgram *(Cajanus Cajan (L) Mill sp)*. *Madras Agric. J.*, 70 : 71-74.

8. Nagarajan, C., T. S. Reveendran, M. N. Prasad and S. R. Sree Rangasamy, 1983. Effect of cytoplasmic divergence on heterotic system of pearl millet. Precongress Meeting of the XV International Congress of Genetics, 7-9, Dec., TNAU, Coimbatore.

9. Nagarajan, C., T. S. Raveendran, R. Appadurai, N. Sundaresan M N. Prasad and M Mani, 1983. A high yielding disease resistant pearl millet hybrid X-5 for Tamil Nadu, *Madras Agric. J.*, 70 (1) : 7-10.

10. Nallathambi, G. and V. D. Guruswamy Raja 1983. Induced viable mutants by combined effect of gamma rays and EMS in rice. *Madras Agric. J.* 70 (5):289-292.

11. Nallathambi, G. and V. D. Guruswamy Raja, 1983 Biological effects of mutagenic treatments in rice. *Madras Agric. J.*, 70 (3) : 149-154.

12. Narayana, D. and M. N. Prasad, 1983. Inheritance of resistance to *Fusarium* grain mould in sorghum. International Congress of Genetics held at New Delhi, 12-21, Dec, 1983.

13. Natarajarathinam, M. and P. Chandrasekaran, 1983. Physiological basis of heterosis for green matter and dry matter production in the hybrid grass TNAU CN 2. Pre congress metting of XV International Genetics Congress, Abstract.

14. Palanisamy, S., M. N. Prasad, S. Vijayakumar and S. R. Sree Rangasamy, 1983. Heterotic effects of new male sterile lines in sorghum and their combining ability. Pre congress meeting of the XV International Congress of Genetics, 7-9, Dec, TNAU, Coimbatore.

15. Palanisamy, S. and M. N. Prasad, 1983. Stability of grain yield in certain variables of sorghum. *Sorghum News Letter*, Vol. 27.

16. Palanisamy, S. and M. N. Prasad, 1983. Prospects of sweet sorghum cultivation in Tamil Nadu. *Sorghum News Letter* Vol. 27.

17. Palanisamy, S. and A. Subramanian, 1983. Genetic analysis of harvest index in sorghum. *Sorghum News Letter*, Vol. 27.

18. Palanisamy, S. and M. N. Prasad, 1983 Variability and inter-relationship between different characters in sweet sorghum., *Sorghum News Letter*, Vol. 27.

19. Prabaker and M. N. Prased, 1983. Correlation and path analysis in segregating populations of Finger millet (*Eleusine Coracana Gaertn). Madras Agric. J.*, 70 (6) : 366-377.

20. Ramanathan, T. and M. Rathinam, 1983. Induced qualitative mutations in groundnut (*Arachis hypogaea* L.) *Madras Agric. J.*, 70 (7) : 427-432.

21. Ramanathan, T. and M. Rathinam, 1983. Effect of mutagenic treatments on character association in groundnut (*Arachis hypogaea* L) *Madras Agric. J.*, 70 (7) : 421-426.

22. Ramanathan, T. and I. Henry Louis, 1983. Heterosis in coconut. Pre congress meeting of the XV International Genetics congress Abstract, p 16.

23. Ramanathan, T., 1983. Induced mutations for quantitative characters in groundnut, *(Arachis hypogaea L.). Madras Agric. J.* 70 (6). 377-381.

24. Rangasamy, M., G. Purushothaman, M R Sivaram, R. Appadurai, S. D. Peter and U. S. Raman, 1983. Co 1. sunflower *(Helianthus annus (L.)) Madras. Agric. J.*, 70 : 75-78.

25. Rangasamy, P. and M. Kadambavanasundaram, 1983 A study of heterosis in cowpea, *Vigna (L.) Walp.* Pre congress meeting of the XV International Congress of the Genetics, 7-9, Dec., TNAU, Coimbatore.

26. Saroja, R. and N. Raju, 1983. Influence of planting time on rice leaf folder incidence *IRRN* 8 (6).

28. Selvaraj, U. and R S. Annappan, 1983. A study of heterosis in cowpea, *Vigna (L) walp.* Precongress Meeting of the XV International Congress of Genetics, 7-9, Dec, TNAU. Coimbatore.

28. Shanmugam A. S., and S. R Sree Rangasamy. 1983. Variability and association studies for seedling chatacters in blackgram *(Vigna mungo (L.) Hepper) Madras Agric. J.* 70 (4): 223 - 227.

29. Shanmugam, A S., and S. R. Sree Rangasamy, 1983. Studies on nitrogen fixation in black gram *(Vigna Munga (L.) Hepper)* and greengram *(Vigna radiata (L)* Wilozek). Proc. Indian National Scientific Acad B 49 (4) : 367-370.

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36	5	1 and 2	on 7th and 8th	From 7th to 8th
37	5	2	Tournament	Tournaments
37	7	8	31 10.83	31.10 84
38	6	14	Privilege	Previlege
38	9	4	Months	Month
40	3	3	And	snd
41	2	3	and	aad
45	4	12	essay	eassy
46			Total 322	222
47	3 below	4	Association	Associatian
48	4	6	Out	Ont
53	7	1	Six	Five
55	1	4	years	year
56	8	3	compared to	than
57	9	2	Suppresses	Suppressess
66	4	12	Correlated	Carrelated
67	1	10	Among	Between
67	5	6	Occurring	Occuring
67	8	2	attained	attaiend
71	4	4	Youths	Youth
73	3 (below Table)	3	Management and Moringa	Management, Moringa
73	3	8	Benefited	Benefitted
74	6	10	Benefited	Benefitted
76	2	4	Benefited	Benefitted
76	4	5	Benefited	Benefitted
	Appendix I			
V	Item	110	Neem and Pungam	Neem, Pungam
X	Item	36	Deterioration	Desterioration

the organic residues, soil application BDS with *Rhizobium* (CC 1) recorded 32.1 % increased grain yield over untreated control.

Pre-emergence application of fluchloralin @ 1 kg/ha followed by hand weeding on 25 DAS recorded higher yield of 991 kg in redgram and 342 kg in groundnut under redgram+groundnut intercropping system than other weed control methods studied at Vamban.

BLACKGRAM

CROP IMPROVEMENT

Variety Released

K 1: The blackgram culture KBG 512 (Co 3 X Us 131) has been released as K 1 blackgram from Kovilpatti during January 1994 based on its overall performance in station trials, MLT and ART. It has recorded an average grain yield of 707 kg/ha with 29% increased yield over the check Co 5. It matures in 70 - 75 days. It is drought tolerant and recommended for cultivation in Southern districts of Tamil Nadu during Purattasi Pattam. (September - October to December - January) both as pure crop and inter crop in cotton.

Promising Cultures

CO BG 301 : This culture was found to be significantly superior to the check Co 5. While the culture recorded 333 kg/ha, the check gave 266 kg/ha. The increase in yield was 25.2 per cent.

The hybrid derivatives viz., x 3-12 (Co 4 X LBG 308) and x 2-2 (ADT 4 X LBG 17) registered 675 and 615 kg of seeds per hectare compared to 479 kg/ha by the check Co 5. The increase recorded were 3.05 and 28.4 per cent. These cultures will be evaluated to their reaction to YMV at Vamban centre through shuttle breeding.

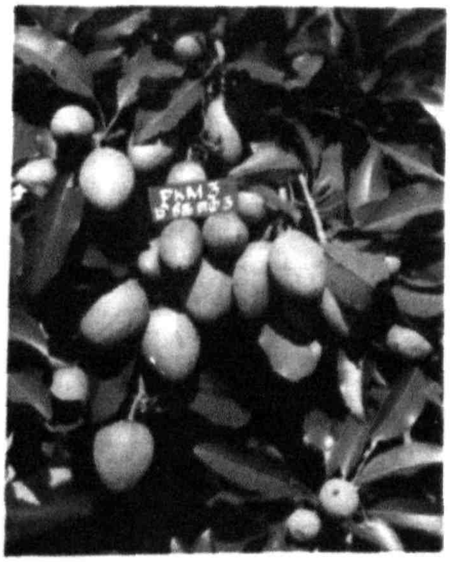
Vamban 11 is advanced promising blackgram cultur resistant to yellow mosaic virus disease. It recorded an average grain yield of 530 kg/ha in multilocation trial during 1993 kharif season and is proposed for Adaptive Research Trial during 1994.

COBG 500, COBG 523, COBG 506 : These three cultures were found to record 604, 583 and 573 kg of seeds per hectare while the check recorded 437 kg/ha. The increase in field over CO 5 was 58.2, 33.4 and 31.1 per cent respectively.

Blackgram
Kovilpatti
(K.) 1

Coconut
Veppankulam
(VPM.) 3

Sugarcane
Coimbatore - Gudiatham
(COG.) 94077



Hybrid Sapota
Periyakulam
(PKM.) 3

CROP MANAGEMENT

The rhizphial strain COC 10 was found to be better than the existing strain BMBS - P4T in increasing the grain yield of blackgram. The increase in grain field accounted to 17.0 per cent.

Two years of field studies at Vamban on the influence of sulphur nutrition on the rainfed blackgram and greengram revealed that combined application of phosphorus and sulphur at the rate of phosphorus and sulphur at the rate of 40 kg/hs each in the form ofDAP and gypsum registered increased seed yield of 71 per cent over control.

A field trial was conducted at Koilpatti to study the effect of different land treatments on the moisture conservation in dry pulses. Medium + shallow tillage coupled with compartmental bunding had recorded highest grain yield of 349 kg/ha in blackgram Co 5. Similarly soil moisture content was also higher (19 - 20 per cent) in compartmental bunded plots receiving medium and shallow tillage.

Experiment conducted at Bhavanisagar during Kharif 1993 in red soil indicated that soil application of K at 15 kg/ha gave the highest seed yield of blackgram 807 kg/ha and was superior to 10 and 0 kg/ha. With regard to micronutrient spray, foliar spray, foliar spraying of $CuSo_4$ at 0.5% at flowering stage registered higher seed yield of 737 kg/ha and it was comparable with 0.5% spray of $ZnSo_4$ (712 kg.ha) and $MnSo_4$ (710 kg/ha) but was superior to $FeSo_4$ spray.

CROP PROTECTION

Seed treatment of blackgram with carbosium @ 3% and 4% reduced the damage by stermfly, bug beetle and aphid significantly.

In blackgram, the root knot namatode, *Meloidogyne incognita* adversely affects the symbiotic prccess of nitrogen fixation by Rhizobium spp. by 29.5 per cent.

GREEN GRAM

CROP MANAGEMENT

Promising Cultures

89047 : This promising greengram culture has been isolated at Coimbatore. This culture was tested in 180 trials under ART during 1993 - 94.

KGG 373 (Co4 X ML 65 - 3 - 4) : During the past three years, the greengram culture KGG 373 (C0 4 X ML 65 - 3 - 4) with the duration of 75 days has performed well registered a mean grain yield of 909 kgs/ha with 24.7 increase over the check Co 5. It has been entered into Adaptive Research Trials on farmers holdings in Southern districts of Tamil Nadu under rainfed vertisol during 1994 Rabi season.

CROP MANAGEMENT

The rhizodial strain Cog 15 was found to be a better strain in increasing the grain yield of greengram over the standard strain CMBS 1. The increase in yield accounted for 7.5 per cent over the standard strain CMBS 1.

Application of 40 kg S/ha in the form of gypsum recorded higher grain yield of 653 kg ha in greengram at Vamban. Application of 20 kg s/ha through gypsum along with 115 kg DAP/ha recorded maximum grain yield in redgram and blackgram.

Along with the *Rhizobium*, coinoculation of *Trichoderma viride* @ 4 g/kg of greengram Vamban 1 recorded better symbiosis over their individual inoculations.

Soil application of biodiegested slurry @ 5 t/ha with seed inoculation of *Rhizobium* (3 A1 3) and *Bacilus megatherium* recorded 26.8% increased grain yield in Vamban 1 greengram.

COW PEA

CROP IMPROVEMENT

Promising Cultures

VCP 8 : It is a vegetable type. It is a selection from IT 81D 228 with an yield potential of 6 tonnes of green pods/ha has out yielded the check variety Co 2 (5 tonnes of green pods/ha) by 20% in onfarm trials. It comes to picking on 60 days onwards after sowing and yields upto 85 days.

VCP 8 : A white seeded cowpea genotype VCP 8, a selection from IT 85F 2020 which matures in 63 days with an average grain yielded of 1200 kg/ha has out - yielded the check variety Pusa 152 (900 kg/ha) by 33%. It is proposed for testing under ART during 1994.

GC - 82 - 7 (KCP 1) : During the past three years, the cowpea entry GC - 82 - 7 (KCP 1) with a duration of 80 days has performed well by registering a mean grain

yield of 1148 kg/ha with 27.3% increased yield over the check Co4. It has been entered into Adaptive Research Trials on farments holdings in Southern districts of Tamil Nadu during 1994 Rabi rainfed season.

CROP MANAGEMENT

The study conducted at Vamban revealed that application of 20 kg K_2O/ha for rainfed pulses viz., cowpea, blackgram and greengram increased the yield to the tune of 30 per cent over control (no application of potassium).

Dual inoculation of *Rhizpbium* with *Bacillus magatherium* recorded 39.6 % increased grain yield in Pusa 152 cowpea in the acid soils of Vamban.

CROP PROTECTION

Two sprays with chlorothalonil 0.1% or one spray with 0.1% chlorothalonil followed by 3% neem oil, after the appearance of the diseases and after 10 days of first spray significantly reduced cowpea rust caused by *Uromyces appendiculatus* and increased the yield to 594 kg/ha and 589 kg/ha respectively as against 3372 kg/ha in the control.

Incidence of cowpea aphid-borne mosaic virus was reduced to 25.4% by erecting sticky yellow trap at 30 cm height (12 numbers/ha smeared with castor oil at weekly intervals + growing a barrier crop of cholam (2 rows of cholam for every 5 metre length of cowpea) + spraying monocrotophos twice (500 ml/ha on 30 and 45 DAS) and by roguing diseased plants on 30 DAS while the untreated check recorded an incidence of 37.4%. The yield increase in the same treatment was 47.2% over control.

BENGAL GRAM

CROP MANAGEMENT

Promising Cultures

Under joint TNAU/ICRISAT Chickpea breeding program two lines viz. CoG 29 (Co 3 X ICC 12237) and CoG 30 (ICC 42 X ICC 12237) were found superior to the check Co 3. The entries were tested at Aruppukottai and Kovilpatti during rabi 1993 under IET in the All India Co-ordinated trial. The cultures CoG 29 and Co 30 have recorded 616 kg/ha and 574 kg/ha respectively with 23.2 and 14.8 higher seed/grain

yield over the check Co 3 (500 kg/ha). These entries are to be tested under MLT during Rabi '94-95 in the same locations.

CROP MANAGEMENT

Inoculation of the rhizobial strain Co Be 13 was found to increase the yield of bengal gram to 753 kg/ha while the standard strain CoC 10 recorded only 653 kg/ha. The increase in field accounted for 10.7%.

Among 102 entries of chickpea studied at Coimbatore for drought tolerance, nineteen entries showed drought tolerance based on drought susceptibility index, biomass and yield.

CROP PROTECTION

Biological control of root rot by combination of antagonists seed treatment with *Trichoderma viride* + *p.fluorescens* (4 g/kg) each was superior to T.virida alone. This combination reduced the incidence of root rot (13.5%) and increased the yield (425 kg/ha).

In chickpea, two early instar larvae/10 plants may be adopted as the ETL for *Helicoverps armigera*. The net income (Rs.5,169/ha) was higher when NPV was applied seven times rather than applied thrice (Rs.1,341/ha) based on ETL.

SOY BEAN

CROP IMPROVEMENT

Promising Cultures

UGM 52 : A short duration advanced cultures UGM 52 (a hybrid derivatives of UGM 21 x IS 335) was under ART during 1993 - 94 seasons. The culture recorded 1368 kg/ha with 14% increased yield over the check Co 1 (1184 kg/ha) in MLT. The culture UGM 52 will again be tested under ART during 1994-95.

VGM 47 : In the Initial Varietal Trial the culture VGM 47 recorded the maximum seed yield of 1753 kg/ha followed by MACS 896 with 1728 kg/ha. The check Co 1 recorded 1580 kg/ha.

CROP MANAGEMENT

With the objective of finding out the water requirement and economics with pulses-castor system, field experiments were conducted for three years with three levels of irrigation and six cropping systems at Bhavanisagar. The results indicated that among the cropping systems soybean + castor (60cm apart) system recorded the highest mean net return of Rs. 7,734 / ha with B/C ratio 2.91.With regard to levels of irrigation, irrigation at 0.60 IW/CPE ratio gave the higest net return and B/C ratio under both sole and intercropping situation. For Priyar district, soybean + castor with irrigation at 0.60 IW/CPE ratio (Once in 10.12 days) can be recommended for getting maximum benefit.

The herbicide alachlor (10% G) @ 2 kg ai/ha applied as pre-emergence spray controlled the weeds effectively in soybean and increased the grain yield and returns comparable to that of hand weeding twice.

At Bhavanisagar, soil application of K at 60 kg/ha to soybean in red soil during kharif season, recorded the highest seed yield of 1657 kg/ha and it was superior to 40 and 20 kg/ha. Among the micronutrient spray, $MnSO_4$ at 0.5% spray at flowering stage registered higher seed yield of 1577 kg/ha and it was on par with $CuSO_4$ at 0.5% (1537 kg/ha) but was superior to $ZnSO_4$ and $FeSO_4$ spray

CROP PROTECTION

There was maximum reduction of root rot (62.4%) and significant increase in yield (1436 kg/ha) of soybean by amending the soil with neem cake (150 kg/ha) in comparison with control.

HORSEGRAM

CROP IMPROVEMENT

Promising cultures

DPI 1562 and DPI 1584 : Two cultures namely DPI 1562 and DPI 1584 were found to be performing well at Paiyur under rainfed condition. These cultures recorded a mean grain yield of 959 and 882 kg/ha over three years (1991-92, 1992-93 and 1993-94) of evaluation whereas the check varieties Paiyur 1 and Co 1 recorded a mean grain yield of 779 and 721 kg/ha respectively. The yield increases were 23 and 13% over Paiyur 1 for DPI 1562 and 33 and 22% over Co 1 for DPI 1584. These two cultures have been entered into Multilocation Trials during 1994-95 season.

CROP MANAGEMENT

Presoaking of horsegram seeds with water and coconut water at 10 per cent has increased grain yield by 22 and 20 per cent over unsoaked dry seeds under rainfed condition at Paiyur.

Studies on the seed treatment, soil and foliar application of Fe and Mo to horsegram / Paiyur 1 revealed that the plots applied with 0.5% of FeSO4 + 0.10% of Na-Molybdate registered the highest grain yield of 814 kg/ha as against the control plot (567 kg/ha). Foliar application of Fe and Mo was found to be better than seed treatment and soil application.

LAB LAB (Avarai and Mochai)

CROP MANAGEMENT

Promising cultures

COLT 21 and DL 3196 : A high yielding hybrid derivative COLT 21 (Avarai) and a promising mochai culture DL 3196 were lestix in OFT during 1993-94. The trials will be repeated during 1994-95 also.

CROP PROTECTION

Two sprayings of endosulfan 0.03% + NPV 250 LE/ha during flowering and pod formation stages of mochai significantly reduced the larvae of *H. armigera* when compared to spraying of endosulfan 0.07% or neem seed kernel extract 5%.

OIL SEEDS

GROUNDNUT

CROP IMPROVEMENT

Variety Released

ALR 2 :

In groundnut culture ALG 56 was released as a location specific variety ALR 2 to Pollachi tract. It is a bunch variety maturing in 105 days. It yields 1740 kg seed pods per heactare under rainfed conditions and 2550 kg/ha under irrigated situations.

It possesses high oil content of 52% and dormancy period of 15 days. This variety is fairly tolerant to rust and late leaf spot diseases and for thrips, leaf hopper and leaf miner.

BSR 1

A groundnut culture ICGS 86143 has been released as BSR 1 during this year for the Western Zone of Tamil Nadu. It is a hybrid derivative evolved from a cross between ICGS 44 x (Robut 33-1) x NCAC 2821) with a duration of 105 days. It possesses moderate resistance to rust, late leaf spot and bud necrosis and a mean yield of 2845 kg/ha, which is 17.5% and 21.6% increased yield over VRI 2 and VRI 3 respectively. It has 21 days of fresh seed dormancy. The oil content is 49.5, shelling 70.3% and SMK 82.4%. The variety is suitable for Periyar, Coimbatore, Trichengodu and Karur areas.

Promising Culture

VG 8918: Abunch groundnut culture VG 8918 is derived from the cross VG 5 x NCAC 17090. It matures in 100-105 days. In the Multilocation Trials conducted during kharif 1993 in seven locations, this culture has registered a mean pod yield of 1497 kg/ha which is 17 and 16.4 % higher than VRI 2 and ALR 2 respectively.

VG 113 : A semi-spreading groundnut culture VG 113, a derivative of *Arachis hypogaea* x *A.cardenasii* matures in 120-125 days. In the MLT conducted during kharif 1993, VG 113 has recorded a mean pod yield of 934 kg/ha as against 789 kg/ha of TMV 10, the yield increase being 18.3%.

VG 9204 : A bunch groundnut culture VG 9204 (VRI 2 x Robut 33-1) has yielded 1324 kg/ha, surpassing VRI 2 by 15%. It takes 100-105 days to mature.

ICGS 86143 : A groundnut culture ICGS 86143 has been released as BSR 1 during this year for the Western Zone of Tamil Nadu. It is a hybrid derivtive evolved from a crose between ICGS 44 x (Robut 33-1) x NCAC 2821) with a duration of 105 days. It possesses moderate resistance to rust, late leaf spot and bud necrosis and a mean yield of 2845 kg/ha, which is 17.5% and 21.6% increased yield over VRI 2 and VRI 3 respectively. It has 21 days of fresh seed dormancy. The oil content is 49.5, shelling 70.3% adn SMK 82.4%. The variety is suitable for Periyur, Coimbatore, Trichengode and Karur areas.

TNAU 256 : A bunch culture TNAU 256 derived from the cross VRI 3 x JL 24 has given 1625 kg/ha which was significantly susperior to Co2 and VRI 2 during kharif season. This has given 54% increased yield over Co2 and 78% over VRI 2 (The yield of Co2 : 1056 kg, VRI 2 : 910kg).

CROP MANAGEMENT

In a three-year study conducted at Vridhachalam, Integrated Weed Management practices of pre-emergence application of metalachlor (1.0 kg a.i./ha + one hand weeding on 30 DAS was found to be more profitable and economical for irrigated groundnut than conventional method of weed control.

Fertilizer prescription equations have been developed at Coimbatore for the dominant groundnut growing soils of Tamil Nadu. Simple nomograms of fertiliser prescription are available for adoption.

Red calcareous soils :

F N = 7.20 T - 0.71 SN - 0.58 ON

F P_2O_5 = 2.24 T - 1.58 SP - 076 OP

F K_2O = 5.47 - 0.33 SK - 0.86 OK

Red Non-calcareous soils

F N = 4.59 T - 0.29 SN

F P_2O_5 = 4.71 T - 6.39 SP

F K_2O = 9.01 T - 0.37 SK

(SN : Available N; SP : Available P; SK : Available - K kg/ha)

Onfarm water management was conducted at Salangaipalayam, for two years in Groundnut during January. The technology packages viz., irrigating Groundnut crop at 0.60 IW/CPE ratio, improved variety (Co2), use of biofertilizer, pre-emergence application of Fluchloralin at 2.0 liter/ha, application of gypsum at 400 kg/ha, use of micronutrient mixture at 12.5 kg/ha and timely plant protection measures were compared with the local farmers practices. The results clearly revealed that above technology package increased the yield of groundnut by 17.3% and net return by Rs. 3825/ha over farmer's practice.

At Tindivanam Prosopis fuliflora pod extract (50% v/v) was found to induce dormancy upto 30 days with minimum germination. Foliar spraying of Prosopis pod extract and neem seed extract on the 80th day were effective in controlling field sprouting and *in situ* Kernal sprouting

A field trial conducted at Coimbatore in Zn deficient soil with VRI 2 groundnut to study the residual effect of Zn enriched coir pith and farm yard manure in Rice - groundnut cropping system indicated the usefulness of the application of Zn enriched organic manure compared to $ZnSO_4$ application *per se*. Application of Zn - enriched composted coir pith at 2.5 ppm at 10 t/ha to the first crop of groundnut recorded the highest pod yield (1640 kg/ha). The per cent increase over ZnSo4 application was 10.8%.

The synergistic effect of the new rhizobial strain and the standard strain TNAU 14 with *Azospirillum* and phosphobacteria were evaluated . Combination of Tt 9 with Azospirillum and phosphobacteria was found to be superior than the combination of TNAU 14 with *Azospirillum* and phosphobacteria at Coimbatore. Combined inoculation of Tt 9 with phosphobacteria at 50 per cent of recommended 'p' level recorded pod yield comparable to the yield recorded with full dose of 'p'. Hence there is a saving of 50 per cent 'p'.

Studies conducted at Virinjipuram have clearly indicated that redgram can be profitably included as a intercrop in groundnut under rain fed conditions with 200 kg/ha of gypsum applied on 25 DAS and 200 kg on 45 DAS.

Ageing groundnut kernels for 3 days (100% RH and 40°C) and subsequently testing the germination under laboratory conditions gave a near estimate of the field emergence.

The TNAU recommended package of practices with VRI 2 groundnut variety recorded an increased yield of 936 kg/ha during rabi/summer season and 430 kg/ha during kharif season over local variety and farmenr's technology at Vridhachalam.

CROP PROTECTION

Sowing of groundnut in July delayed (60 DAS) appearance of late leafspot and increased the yield to 1400 kg/ha compared to August sowing when the disease appears at 45 DAS and yield was only 915 kg/ha. Hence sowing may be taken up in July upon receipt of rains.

Increase in late leafspot by one grade decreased the yield by 200 kg/ha Therefore fungicidal spray should be given as soon as the disease reaches grade 3.0

Seed treatement i.e. talc based P. fluorescens 4 g/kg followed by root zone application (2.5 kg + 50 kg of sand/ha) 30 and 60 DAS reduced the incidence of root rot and increased the yield.

Twenty three rust and late leafspot groundnut entries received from ICRISAT were screened and four entries viz., ICG 6284, 7888, 10052 and 10939 were found to show resistance to the above diseases. These are being utilised in the breeding programmes.

The pre-release semi-spreading groundnut culture VG 113 recorded grades of 1.8 and 1.2 of LLS and rust respectively as against 4.6 and 3.0 of these diseases recorded in TMV 10. Hence this entry may be advanced to Adaptive Research Trial.

SESAMUM

CROP IMPROVEMENT

Promising Cultures

VS 350 : It is an early maturing (70 - 75 days) and higher yielding sesame culture selected from Thirukkattupalli local. It is being evaluated in ART during kharif and rabi season.

VS 903 : This promising culture matures in 85 - 90 days in the MLT conducted during kharif'92 it has recorded a mean yield of 308 kg/ha as against 305 kg/ha of TMV 3. During rabi ' 92 - 93, it has registered a mean seed yield of 499 kg/ha (over four locations as against 402 and 491 kg/ha of TMV 3 and Co 1, respectively. Similarly during summer '93 it has recorded an average yield of 668 kg/ha (average of 7 locations) having an yield advantage of 20.7 and 14.2 % over TMV 4 and TMV 6 respectively. It is also tolerant to powdery mildew. This culture is also proposed for Adaptive Research Trial.

VS 9104 : The culture VS 9104 (85 - 90 days) is derived from the cross TMV 3 X VS 345. In the station trials conducted during the last 7 seasons, it has recorded a mean seed yield of 465 kg/ha compared to 387 kg/ha of Co 1. Hence this culture is proposed for MLT.

CROP MANAGEMENT

Split application of 50 kg of N/ha at basal and 3 weeks after sowing recorded higher seed yield of sesame (758 kg/ha) with a net return of Rs. 4158/ha and cost benefit ratio of 1.73 at Vridhachalam.

CROP PROTECTION

In gingley *Trichoderma viride* (Bio - control agent - 48 kg) and *Azospirillum* (Bio - fertilizer) were compatible for seed treatment. In combined treatment, root rot incidende was 3.8 % as against 19.5 % in control. The combined treatment increased the yield to 626 kg/ha as against 385 kg in control. The combined treatment also enhanced the *crop growth*. This indicates that both bio - control agent and bio fertilisers can be applied as a single treatment.

A vermiculite based product of *Trichoderma viride* for soil application was developed. *Trichoderma viride* (Seed treatment @ 4 g/kg + soil application of vermiculite formulation @ 125 Kg/ha) significantly reduced the root rot disease and increased the yield and oil content compared to KC1 and control treatments in gingelly. The soil application was done 90 DAS.

The intercropping studies showed that incidence of shoot and capsule borer was significantly lesser in sesame and greengram (6:1) and sesame + groundnut (4:1) when compared to sesame alone.

Correlation studies with weather factors indicated that maximum temperature was postively correlated with caspule borer while rainfall was negatively correlated with pest incidence.

SUN FLOWER

CROP IMPROVEMENT

Promising Culture

TNAU SUF 7 : An elite culture TNAU SUF 7 has been identified. (a derivative of the cross Dway x Surya). It matures in 88 days. When tested in All India Co. ordinated Trial for three years namely Kharif 90, Kharif 91 and Kharif 92, this culture gave a mean yield of 1114 Kg/ha with 32 and 16% increase in yield over Morden and EC 68414 respecively. In terms of oil yield, TNAU SUF 7 recorded mean yield of

428 Kg/ha with 39% and 14% increase over Morden and EC 68414 respectively. Inview of its superior performance over Morden, EC 68414, TNAU SUF 7 has been identified for release by the Central variety Release Committee. Thsl entry is now proposed for Adaptive Research Trial in Tamil Nadu.

TNAU SUF 10 : The promising culture recorded in mean seed yield of 1274 Kg/l.a with 50.4% increase over Morden (847 Kg/ha) and 42.9% increase in yield over EC 68414 (891 Kg/ha). In terms of oil yield also TNAU SUF 10 was the first with a mean yield of 468 Kg/ha and 67.1% and 49.5% increase over modern EC 68414 resepectively. The culture is being evaluated in ART.

TNAU SUF 11 : This promising culture recorded mean yield of 1186 kg/ha with 40% increase over Morden and 33.2% increase over EC 68416. In terms of oil yield also TNAU SUF 11 recorded 427 kg/ha with 52.5% and 36.4% increase in yield over Morden and EC 68414 resepctively.

TNAU SUF 13 : In the station trials conducted at Coimbatore during Kharif 92 and Kharif 93 TNAU SUF 13 recorded a yield of 1501 Kg/ha with 19% increase over Co2, the best check. The seed contains 36.2% of oil. In terms of oil yield TNAU SUF 13 gave 543 Kg/ha with 17.5% increase over Co2. The cuture is proposed for multilocation Trails and Co-ordinated Trial during Kharif '94.

Hybrid TNAU 9105 : Sunflower hybrid TNAU 9105 (IA X 272) has been developed. TNAU 9105 gave a mean yield of 2226 Kg/ha accounting for 30.75% increase over MSFH 17. The hybrid matures in 85 days with an oil content of 39.6%. This hybrid has been proposed to MLT and AICORO coordinated trail during Kharif '94.

CROP MANAGEMENT

The best time for the production of BSH1 Sunflower hybrid seed is May to August where perfect synchronisation occurs. A planting ratio of 1:4 (Male to Female) and an application of 90:90:40 Kg NPK/ha are optimum to get higher yield (995 Kg/ha) of good quality seeds in BSH1. Seed processing and density grading in a specific gravity grader enhances the vigour and viability of hybrid seeds. Hydration-dehydration treatment of 5 month-old seeds using disodium phosphate (10-4M) prolonged the shelf life (up to one year) and enhances the productivity.

For Coimbatore tract, a package of recommendation viz., recommended dose of NPK, 25 Kg S/ha through gypsum, overnight soaking of seeds, 0.2% borax spray to the capitulum at ray floret opening stage and hand pollination increased the yield (1312 Kg/ha) over farmers practice (895 Kg/ha) in sunflower.

At Bhavanisagar, the result of continuous application of $ZnSO_4$, $CuSO_4$ and $FeSO_4$ each at 0, 12.5 and 25 Kg/ha in sunflower-groundnut-sorghum system from 1975 to 1994 revealed that continuous application of $CuSO_4$, eventhrough, was found to be favourable for groundnut (35th and 37th crop) but it reduced the yield of sorghum at 25.0 Kg ha. continuous application of $ZnSO_4$ and $FeSO_4$ each at 12.5 Kg/ha increased the yield of sunflower (33 and 37th crop) and sorghum (35th and 38th crop). The rate of build up of available Cu in the soil is more compared to Zinc status. Continuous application of Zn, Cu and Fe did not result in increasing the available nutrients to a toxic level.

CASTOR

CROP IMPROVEMENT

Promising Cultures

Two high yielding castor cultures viz. TVC 31 and TVC 15 were in adaptive research trails. From the 1993-'94 results, TVC 31 has shown its superiority over other cultures and check varieties (TMV 2 and TMV 5) in yield. TVC 31 has recorded a mean (12 locations) yield of 825 Kg/ha under pure crop which is 21% increased yield over TMV and 18.6% over TMV 2. As an intercrop in ART, TVC 31 has recorded mean yield of (6 locations) 475 Kg/ha which is 8.3% and 69% increased yield over TMV 5 and TMV 2 respectively.

Hybrid Castor TMCH 1 : This hybrid has performed better than ruling GCH 4 hybrid in the station trails. Under irrigated condition, on an average it has recorded 1302 Kg/ha in four seasons which is 15.6 and 22.8% increased yield over GCH 4 TMV5 respectively. Under rainfed condition also TMCH 1 has registered mean yield of 975 Kg/ha which is 6.6% and 26.4% increased yield over GCH 4 and TMV 5 respectively. Hence, the castor hybrid TMCH 1 is proposed for multilocation testing (MLT) and ART simultaneously during 1994-95.

CROP MANAGEMENT

Azospirillum and phosphobacteria were tried as seed treatment (3 packets/ha) and seed plus soil application on rainfed castor crop (TMV 5) at Tindivanam from 1992. Results indicated that seed treatment with *Azospirillum* increased the yield of castor over control by 26% during 1992. When the cost benefit worked out, application of *Azospirillum* through seed gave additional increase of Rs. 834 per ha during 1992. Combined application of *Azospirillum* and *phosphobacteria* through seed and soil gave additional increase of Rs. 537/= per ha during the year 1993. Further during 1993, it was found that the treatment wherein 25% N was reduced (because of the application of *Azospirillum* through seed and soil) was on par with 100% N application so there is a possibility to reduce N by 25%.

JATROPHA

Crop Improvement

A total of 72 types of *Jatropha sp.* were collected from different places of Tamil Nadu and Port Blair. Cent per cent establishment of cuttings and seedlings was recorded in the case of *Jatrop a curoas*. But it was only 88% in *Jatropha cossypifolia*. Preliminary study on floral biology of *Jatropha* sp. was initiated.

COCONUT

Crop Improvement

Variety Released

VPM 3 : This high yielding tall variety is a selection from the materials received from CPCRI and has a duration of 80-100 years. It has a yield capacity of 92 nuts / palm / year. and 15 kg copra / palm / year. The increased nut yield of this variety accounts for 26.4 per cent higher than ECT. This variety was found to have better resilience against rainfall variations. It has high oil consent (70%). It is suitable to grow in all districts of Tamil Nadu.

Crop Management

In multistoreyed Cropping systems Banana and Pine apple combination with coconut gave a net return per unit area (Rs. 27,055/ha) followed by Banana, guava and yam in another model (Rs. 16,765/ha) over and above the sole cropping at Veppankulam. The cost benefit ratio was 1:4.2 and 1:3.2 in model I and II respectively against 1:2.6 for coconut as sole crop. In mixed cropping system the nut yield increased from 50.6 to 94.7 and 50.8 to 80.5 nuts/palm in model I and II respectively.

Crop Protection

Application of Phosphobacteria mixed in 10 Kg of farm yard manure was found to be useful for the management of the disease. Five Kg of neem cake has to be applied in the basins of the diseased tree. After one month, one packet of phosphobacteria (200 g) mixed with 10 Kg of farm yard manure has to be applied. This may be done preferably between September and January months. The trees should be given regular irrigation.

The biofertiliser treated palms recorded lesser disease index of 34.8 and higher nut yield of 102 when compared to control with the recorded higher disease index of 79.0 and lesser not yield of 76 per palm. The cost benefit ratio was 1:3.

Root feeding with 20 ml of neem oil + 20 ml of water + 0.5 ml of teepal per palm twice at six monthly interval was found equal in efficacy as that of the treatment with root feeding of Nuvacron 36 WSC @ 10 ml + 10 ml of water per palm against red palm weevil.

Calcium sulphate + magnesium sulphate (500 g each) along with 5 Kg of neem cake was found to give lesser disease index (27.2) as compared to 70.8 in control. The nut yield was 110 per palm per year in the treated palms as against 76 in control. A field experiment was initiated during January 1992 to study the effect of micro and secondary nutrients in the management of Thanjavur wilt.

COTTON

Crop Improvement

Promising Cultures

TKH 590 and TKH 789 : These two medium staple G. *hirsutum* cultures are being evaluated against the check variety LRA 5166 in ART in farmers' fields in 25 location spread over three districts viz. V.O. Chidambaranar, Nellai Kattabomman and Kamarajar.

TSH 188 and TSH 192

Srivilliputhur : Two cotton cultures TSH 188 and TSH 192 developed at Cotton Research Station, Srivilliputtur were found to be high yielders combined with tolerance to leaf hopper. The duration of the cultures ranges between 150 and 160 days. The seed cotton yield of TSH 188 was 1800 kg/ha and that of TSH 192 was 1531 kg/ha as compared to 1383 kg in SVPR 1. These two cultures belong to medium staple category.

Crop Management

Results of two season trials indicated that intercropping system in cotton reduced the kapas and seed yield by 50% due to reduction in plant population. The reduction was more in alternate row system than in paired-row system of intercropping. Among the comparison crops, cowpea and soybean had smoothening affect in the base crop and slightly reduced the number of sympodial branches, yield and quality of the resultant seeds. However, seed quality reduction was not evident in fresh seeds of both the base and companion crops but upon storage the seeds from the intercropping system deteriorated faster than the counter part seeds of the pure crop.

Field trials were conducted for two years at Aruppukottai under dryland conditions using acid delinted cotton seeds (var. MCU 10) hardened with 2 per cent KCL and pellctring with five different leaf powders (each separately) before rowing. The results indicated that the superiority of hardening and pelleting over control. Hardening with 2% KCL and pelleting with pungam leaf power recorded higher yield of 802.6 kg per ha.

A study conducted at Srivilliputhur on the organic farming practices with that of inorganic farming for summer irrigated cotton, INM + IPM treatment recorded the highest yield of 1275 kg/ha which is 85.5 per cent increase over control (637 kg/ha). A

high net return of Rs. 6925 per ha was received in the same treatment as compared to control (Rs. 2610 per ha). In the past incidence, the result indicated that INM + IPM treatment registered less incidence of leaf hopper 0.5 leaf hoppers/leaf as compared to control (1.3).

A study on chemical defoliants at Srivilliputhur NaCl 20% spray at 75% boll bursting stage recorded the highest seed cotton yield of 1629 kg/ha, followed by spraying drop 200 g/ha (1468 kg/ha). The control recorded a seed cotton yield of 1237 kg/ha. Hence 32.5% increased yield (402 kg/ha) was recorded over the control by spraying NaCl 20% at 75% boll bursting stage. When drop was sprayed the defoliation was complete when compared to other treatments. In the quality trails studied, there is no reduction in the quality in the treatments when compared to control.

A field trail at Kovilpatti to study the effect of seed treatment with DAP on rainfed cotton revealed that seed treatment with 2% DAP recorded highest kapas yield in both delinted (917 kg/ha) and linted (877 kg/ha) cotton besides enhancing the gross and net income in cotton. However, 3% DAP seed treatment has reduced the kapas yield in both delinted (642 kg/ha) and linted (602 kg/ha) cotton.

In the first year of study conducted at Kovilpatti on bio-mulches for rainfed cotton revealed raising sunhemp in between cotton rows and cutting after 25 DAS and spreading in between cotton rows recorded significantly higher kapas yield which was 77% higher over un-mulched plots.

Fuzzy cotton seeds coated with gum arabic became feasible for grading in a specific gravity separator. The denser seeds so separated recorded higher germination and vigour compared to lighter seeds. The seeds coated with gum arabic stored better than those coated with rich gruel and starch. Coating fuzzy seeds with cowdung slurry reduced the germination and retarded the seedling growth.

Pelleting the fuzzy seeds with 60 g DAP and 15 gm of gypsm/kg using 4% starch solution as adhesive improved the germination and seedling vigour. Pelleted seeds performed well at 60% WHC of the soil and placed at 5 cm depth. The pellet seeds can be stored up to 4 months satisfactorily under ambient conditions. Colouring fuzzy seed with composed methyl orange did not affect seed quality and storability.

Crop Protection

Based on action threshold levels and seed cotton yield, the ETL for *H.armigera* has been worked. The ETL for egg larvae and damage (%) for four insecticides based on gain threshold (GT) is as follows :

Chemical	Egg	Larva	Damage (%)
Carbaryal	0.41	0.19	2.02
Phosalone	0.67	0.31	3.25
Endosulfan	0.48	0.22	2.32
Quinalphos	0.86	0.40	4.18

Cotton intercropped with cluster beans (2:1) was found to reduce the leafhopper population and bollworm damage. The leafhopper population ranged from 2.89 to 20.44 / 5 plants when compared to 7.22 to 30.33/5 plants in the sole corp of cotton. The bollworm damage varied from 14.66 per cent to 20.94 per cent.

Chemical Spraying of Margocide 0.5% and neem oil 3% thrice at fortnightly interval were effective in reducing the leafhopper population and gave increased yield of 1334 and 1396 Kg/ha, respectively when compared to untreated check which recorded only 815 kg/ha.

Seven chemicals were tested for controlling grey mildew. Three sprays were given, one immediately after the disease appearance (90 DAS) and subsequently 2 sprays were given at 15 days interval. The maximum reduction in grey mildew disease was noticed in Haxaconasole spray (19.3 %) compared to 42% in control. The yield was increased by 26.1 per cent in Hexaconasole (1565 kg/ha).

SUGARCANE

Crop Improvement

Variety Released

COG 94077 : The clone G 85003 (derivative of Co 740 x Co 775) was found to be a promising jaggery variety. The clone G 85003 recorded significantly higher cane yield of 133.6 tonnes/ha as compared to standard CoC 771 and Co 740 which recorded 117.3 t/ha and 97.5 tonnes/ha respectively in plant crop. The increase was 37% and 81.1% in cane and jaggery yield over Co 740 and 13.9% and 26.7% over CoC 771

variety. In the ratoon crop, C 85003 recorded 19.6% increase over CoC 771 and 42.4% increase over Co 740 in cane yield. There was an increase of 91.2% over Co 740 and 32.9% over CoC 771 in jaggery yield of G 85003. In the multilocation trails conducted at 22 locations, G 85003 recorded significantly higher cane yield of 133.2 t/ha as compared to check CoC 771 and Co 740 which recorded 118.6 and 105.3 t/ha. G 85003 also recorded 14.5 tonnes of jaggery yield as compared to 11.4 and 8.8 tonnes/ha recorded by CoG 771 and Co 740. G 85003 was released as sugarcane jaggery variety CoG 94077. It is an erect, tall growing non-lodging, moderately drought tolerant variety which matures in 330 days.

Promising cultures

C88011 : This early season clone recorded higher cane yield of 131.2 t/ha as compared to the check CoC 91061 (128.4 t/ha). The CCS is 12.4 % as against 13.1 % in the check CoC 91061. However this clone possesses higher resistance to red rot diseases. It is being tested in ART.

C 88064 : In the mid late group the clone C 88064 recorded significantly higher cane yield of 124.0 t/ha as compared to 166.8 t/ha in the check Co 6304. In respect of juice quality the clone C 88064 registered significantly higher CCS of 12.9% as against 11.9% in the check of Co 6304. The new clone registered an increased sugar yield.of 15.8 % over the check Co 6304 by recording 16.0 tonnes of sugar/ha as against 13.9 t/ha in the check Co 6304.

Si 86018, 86071, 86075 : Clone Si 86018 across derivative of Cosi 776/CoC 8001, recorded 18.3 % over check in the early group. Clones CoSI 86071, 86075 (Bo 91/Q 62198) suitable for the early drought and late water logging conditions of Cauvery delta were advanced to CAE, 94 - 95.

Si 86098, 87007,87011 : In the mid/late group, Si 86098 (Bo 91/Co 62198) recorded 9.6% higher yield over the check Co 6304. Two other clones Si 87007 and Si 87011 (derivative of Co 776/Q 68 and Co 82062GC) also recorded superior yields over the check and all the above three clones were advanded to CAE.

Co 86032 : In the evolution of early clones under AICRP on sugarcane at Sugarcane Research Station, Cuddalore, the entry Co 86032 recorded higher cane and sugar yield with better juice quality than the national checks ie. Co 6907 and Co 7508. The entry will be forwarded for CAE trial after confirmative results.

CROP MANAGEMENT

Studies on the Weed Management in sugarcane intercropping system conducted at Cuddalore revealed that pre-emergence application of Thiobenacarb @ 1.25 kg ai/ha under inter cropped systems in sugarcane with soyabean, blackgram or groundnut recorded around 85.0 per cent weed control efficiency. Irrespective of herbicidal application, soyabean as intercrop has given 733.4 kg of grain yield/ha, followed by blackgram with 412.2 kg/ha and groundnut with 215.1 kg/ha. Raising of soybean, blackgram or groundnut have not affected the cane yield. Comparatively higher yield of 111.2 t/ha has been recorded by sugarcane + blackgram + Thiobencarb combination. Highest gross income of Rs. 43210 was recorded in the combination of sugarcane + blackgram applied with Thiobencarb used as herbicide. The juice quality was not influenced by intercrops and herbicides.

The study on various techniques in gap filling in ratoon sugarcane at Cuddalore, revealed that filling the gappy areas in the ratoon sugarcane crop within 30 days of harvesting the main crop with the sprouted cane stubbles take from the same field recorded full establishment. This was followed by gap filling with seedlings raised in polybags. The maximum cane yield of 113.5 t/ha was recorded in the treatment where the gappy areas were filled with sprouted stubbles taken from the same field followed by the gap filling with polybags (110 t/ha). There was no significant difference in juice quality among the different treatments. The highest sugar yield 13.0 t/ha was recorded in gap filling with sprouted stubbles closely followed by the gap filling with the polybag seedlings with 12.6 tonnes of sugar/ha. The above study indicated that gap filling in ratoon can be taken either with sprouted stubbles or polybag seedlings.

Intercropping of soybean (Co 1) in ridge side planting resulted in a yield of 770 to 970 kg/ha without any adverse effect on cane yield at Sirugamani. Soybean intercropping recorded an increased net profit of 10 to 20 per cent over sole crop of cane.

Inter cropping of daincha in ridge side planting and in corporation of the same on 60th day after planting of sugarcane recorded an increased yield of 20.25 t -1 over sole crop of cane, besides increasing the soil fertility level.

Pre - emergence application of oxadiazon @ 0.750 kg/ha was found to be economical for cane + soybean and cane + daincha intercropping. With increased weed control efficiency the yields of cane and intercrop were also increased.

Field experiments conducted at Sirugamani to fix the economical doses of fertilizers in combination with pressmud, neemcake, bio - fertilizers, Azospirillum, Phosphobacteria and micronutrients along with different doses of N revealed that 25 tons pressmud + 210 Kg N/ha + Azosprillum + Phosphobacteria + Micronutrient mixture 50 Kg/ha recorded maximum tiller production of 2.17 lakh/ha. The treatment did not influence the germination percent of both the varieties of Si 86071 and CoC 92061.

To study the influence of water management in sugarcane under moisture stress condition at Melalathur Mulching coir pith along furrows and ridges on 35th day and irrigation once in 10 days resulted into increased cane yield and sugar yield. The above treatment recorded 140.6 tonnes cane yield and 17.8 tonnes sugar yield per ha as against 125.6 tonnes cane yield and 13.8 tonnes sugar yield recorded in control plot (No mulch) irrigated once in 10 days.

Studies were undertaken in CoC 671 with cane setts and true seeds. Among the age groups, the eight month-old canes showed their superiority with regard to seed characters compared to 10 and 12 month-old canes. Total reducing sugars, amino acids, and tetrazolium test for vigour showed a decreasing trend from top to bottom portion of cane stalk. Seeds of high quality are obtained from the basal portion of inflorescence. Pyridozine treatments at 0.1% and 0.2% for sets and seeds, respectively registered high germination.

Crop Protection

From the results of the work done at Cuddalore it was found that sugarcane leafhopper, *Pyrilla perpusilla* can be effectively controlled by spraying a monocrotophas 36 WSC @ 0.072%

FORAGE CROPS

Crop Management

The seed crop of lucerne ie to be fertilized with 20:160:40 Kg NPK/ha for getting higher yield of good quality seeds. Two foliar sprays of NAA @ 200 ppm first at 50% flowering and the second at full bloom stage prevented the flower drop to the minium and resulted in higher yield of quality seeds.

Seed treatment with Azospirillum and Phosphobactrium mixture saves 25% of the recommended doses of N & P for cereal fodders (Cumbu, Maize and Sorghum) and forage grasses (Cumbu Napier Hybrid grass, Guinea grass and Deenanath).

In Deenanath grass the physiological maturity of seeds (fluffs) attained on fourth and sixth week after 50% flowering in Cv.Pusa 3 and TNDN 1, respectively associated with good germination and vigour.

DAINCHA

Crop Improvement

Promising Cultures : Two daincha cultures AS1 and AS5 possessing a biomass potential exceeding 10 t/ha and pre-flowering duration of 44 days are under multilocation test in five locations.

BREEDER SEED PRODUCTION

The breeder seed production programme has been formulated based on the consolidated indent received from the Director of Agriculture, which includes the breader seed requirement of corporate bodies and seedmen. The details of breader seed production and supply during the year 1993-94 are furnished below :

Crop	Quantity in Quintal	
	Indented	Supplied
Paddy	214.75	240.60
Millets	1.14	1.61
Cotton	0.86	0.72
Pulses	187.32	131.11
Oilseeds	1787.28	489.43
Vegetables	0.42	0.42

Centre for plant molecular biology

Anther culture was done in indica-japanics hybrids. So far 533 number of anther derived doubled haploids (true breeding) lines have been selected. These breeding lines possess dense panicles and other desired combination of traits. Based on the preliminary yield evaluation, two cultures have been identified TNAU 90012 and TNAU 90013 are in MLT.

Protoplast culture technology in rice has been applied to generate protoclone variation. The selected protoclone progenies in IR50 and Co 45 will be evaluated in next season for yield.

Micropropagation technique/protocol has been evolved for propagation of neem which is an important botanical pesticide.

Techniques for regeneration and shoot multiplication has been worked out in casuarine. DNA isolation protocol methods for restriction have been worked out.

For identification of DNA marker associated resistance gene loci for BPH resistance; mapping population (F6) involving crosses of *officinalis* derived BPH resistant lines with IR 50 and IR 36 (IR 50 x 9195 and ASD 16 x 9195) was developed and is under testing.

Mung bean storage albumin gene cloning : Towards improving the quality of rice proteins by genetic manipulation, initial attempts to isolate gene for protein rich in essential amino acids such as lysine and threonine were commenced. The isolation of gene coding for a storage albumin (Mol. Wt. 12,000 Daltons) from mung bean was targeted. Four putative positive genomic clones have been screened out of a partial genomic library constructed in Bluescript and are being studied to precisely isolate the gene encoding the storage albumin.

The protein has been purified by reversed phase - HPLC to homogeneity and used to raise antiserum to use in fishing out the genomic clones by expression screening. cDNA library has also been constructed and is being screened for the cDNA clones encoding this albumin. Once, by these approaches, the gene for mungbean albumin is available attempts will be made in the next phase to genetically introduce this gene into rice.

Processing Methods on the Preservation of Oyster Mushroom : Cultivated mushrooms are highly perishable. Due to normal senescence phenomena and/or

microbial activity mushrooms rapidly begin to darken and lose its quality. Three methods of drying viz. sundrying, thin layer drying and fluidized bed drying along with pretreatment using antimicrobial agent (Potassium meta bisulphite-KMS) were tried for preserving oyster mushroom. Dried mushrooms were stored in polythene bags for a period of three months and the change in the qualities were assessed periodically. Results showed that different drying practices did not have any effect over the biochemical constituents of mushrooms. Reduction in the protein, carbohydrate and free amino acid contents besides changes in browning index was noticed in the pretreated samples. Control showed intensified browning during drying whereas whiteness was more in treated samples. After three months storage not much variation was noticed in the carbohydrate content but a slight increase was found in the free aminoacid content and browning index.

Quality of Oils extracted from Sunflower Hybrids : Study on the effect of storage containers such as tin, aluminium, glass, stainless steel jars on the keeping quality of oils extracted form the hybrids developed at TNAU (85131, 85144, 85151) revealed that tin containers were most suitable for storage of oil even upto a period of 6 months. Oils stored in tin containers showed minimum peroxide value and free fatty acid values, whereas the oils stored in aluminium and glass containers showed maximum peroxide and free fatty acid values.

HORTICULTURE

Pomology

Banana

Crop Improvement

A high yielding variant of `Sanna Chenkadali', diploid red banana has been identified (Code named as AA-1) as a potential clone suitable for home gardens and also for commercial cultivation. It has been tested for four years at Coimbatore Campus. The suckers have been multiplied for MLT purpose.

Crop Management

The conventional recommended spacing of 2.1 x 2.1 M recorded the desirable bunch characters viz. number of fingers/bunch, hands/bunch and weight of the bunch (36.95 t/ha). But the total yield (81.71 t/ha) was higher in closer spacing of 1.2 x 1.5 M, 1.2 x 2.0 (75.57 t/ha), 1.5 x 2.0 (71.99 t/ha) and 1.5 x 1.5 (70.04 t/ha).

But the high cost benefit ratio at 1:2.47 was observed in the spacing of 1.5 x 1.5 M, with population of 4444 plants / ha.

The variety Karpooravalli recorded the highest leaf member (13.0), leaf area (11.75 m^2)/plant relative water content (90.4%) and bunch weight (19.53 kg) when it was irrigated it 20 mm CPE, while the variety Poovan recorded high leaf (11.0) leaf area 9.63 m^2 /plant, relative water content (89.23%) and bunch weight (13.63 kg bunch) when irrigated at 60 mm CPE.

Out of 5 spacings tested, 1.5m x 1.5m spacing found to record higher yield in D.C. banana than the existing spacing of 1.8 x 1.6m in Vellore region. Under 1.5 x 1.5m spacing, 1358 plants can be additionally planted.

When the spacing was reduced to 1.5m x 1.2m and 1.2 x 1.2m, the bunch and finger weights were significantly reduced.

Glyphosate applied at 2 kg/ha, i.e. one kg at 30 days after planting and another one kg after 60 days of planting followed by earthing up on 3rd month recorded more number of hands per bunch (8.1) more fingers 12.7 t/ha hand and more weight of bunch (21 kg) resulting in more fruit yield (64.07 t/ha).

Crop Protection

In a trial to control panama disease revealed that injection of 3 ml of carbendazim 2% solution during 5th, 7th and 9th month reduced the disease incidence. Carbendazim capsuls application (60 mg/capsule) during 5th, 7th and 9th month was found to be the next best in reducing the disease incidence.

MANGO

Crop Improvement

High yielding Dwarf Rumani Selection

DPI-55 is a clonal selection for dwarf stature from Cv. Rumani from Karukkanchavadi village near Kaveripattinam. This selection is suitable for high density planting with a spacing of 5m x 5m (400 trees/ha) as against 100 trees/ha with normal Rumani. It is a regular bearer with good yield.

Crop Management

A trial was conducted to select the rootstock for large scale multiplication of commercial cultivars. Alphenso and Bangalore were used as rootstock over which the Cvs. Senthura (early), Bangalora (mid) and Neelam (late) were grafted with (i) No precuring (ii) Precuring 5 days before and (iii) precuring 10 days before.

The highest percent of success (82%) was recorded when Bangalore was grafted on its own stock with scions precured 10 days prior to grafting.

The Bangalora grafted on Alphonoso stock recorded 76% success. The scions of Bangalora recorded highest % of success (61%) irrespective of root-stock used and this is 15% and 33% higher over that of Neelam and Senthura.

SAPOTA

Crop Improvement

Variety Released

Hybrid Sapota PKM3 : Hybrid 7/1 (Guthi (PKM.1) x cricket Ball) was released as PKM.3 hybrid sapota during January, 1994. It is high yielder (14 h/ta). It bears oval shaped large fruits in cluster of 2-3. The characteristic vertical growth habit of this hybrid allows for high density planting. It is suited for growing under irrigated and rainfed conditions.

PAPAYA

Crop Improvement

New Gynodioecious papaya

A new papaya hybrid line CP.81 has been developed at Tamil Nadu Agrl. University, Coimbatore by crossing Coorg Honey D with CP.75 (Pusa Delicious x Co.3). It is a gynodicecious papaya with the horticultural traits better than Co.3. It is red fleshed with low incidence of "Stamen carpellody".

In Co.2 papaya, red flesh variants were observed at Horticultural College and Research Institute, Coimbatore. Critical studies on floral biology of many male population in Co.2 papaya led to the isolation of a male tree having distinctly reddish orange tapetal tissues in anthers while others are cream yellow. Progenies of the

cross between this male with Co.2 (Red flesh) produced 100% red fleshed female, while there was one out of 100 male trees with reddish tapetum of anthers. One of the promising F_1 progenies, code named as 9-1 (D) was compared and found superior than Co.2. Studies are under way to stabilize red colour of flesh in dioecious papaya and large scale multiplication of selected males through tissue culture, for large scale seed production.

Crop Management

For mass multiplication of papaya through shoot tip culture, the optimum size of the explant for maximum response was found to be 10 mm which produced 8.4 shoots in modified M.S. medium containing BAP at 0.5 mg/1 + NAA 0.05 ml/l.

Crop Protection

A field trial was conducted at Tamil Nadu Agrl. University, Coimbatore during monsoon season 1993 for the control of root rot and wilt. Ridomil 0.2% was the best treatment which recorded 18.9 per cent incidence followed by Bordeaux mixture one per cent which recorded 24.5% incidence as against 52.5 per cent incidence in control.

BER

Crop Improvement

Promising selections

The Cv. Kaithali had recorded the highest mean yield of 39.2 kg over a period of 7 years. It is followed by the Cv. Gola and Umran (28.5 and 28.2 kg respectively).

Crop Management

Provision of shallow basin with 5% slope around the tree trunk reduced the runoff water and helps in conservation of moisture and the yield increase was 2.71, 2.68 and 3.19% respectively over three years.

Pruning in Ber

Pruning during January and February increases the yield viz. 30 kg and 29 kg respectively. Pruning thereafter reduces the yield. Pruning during April-May recorded low yield of 15 kg and 16 kg respectively.

CUSTARD APPLE

Crop Improvement

Promising selection

The seedling selection viz., AS.1 from the collection from Courtallam area recorded the highest annual mean of 7.5 kg/tree under rainfed conditions. The mean yield of other collections range from 1.7 kg to 4.1 kg. The budded plants from AS1, are multiplied for distribution.

AMLA

Crop Improvement

Promising selection

E.O.3 : The seedling selection from Srivilliputhur namely E.O.3 recorded consistently higher yield over a period of three years with yield of 56.5, 20.8 and 75.5 kg respectively. The mean yield over the period is 60 kg per tree/year.

T6-6 Amla

At Bhavanisagar, among the 6 accessions of amla evaluated from 1979, the T6-6 recorded higher yield of 150.4 kg fruits/tree closely followed by T6-4 (143.9 kg/trees). The weight of single fruit of T6-6 was 27.3 g as against 24.5 g in T6-4.

MANDARIN ORANGE

Crop Management

Nutrition of Mandarin Orange

Experiments were conducted in private mandarin orange orchards to study the effect of K in the form of KNO3 and Ca in the form of Ca $(No3)_2$ at varying concentrations (0,0.5 and 0.75 per cent) and in combination on the yield and quality of 13 - 14 year old mandarin orange trees. The results indicated that 0.5 per cent KNO3 sprays at flowering and fruiting stages significantly increased the number of fruits (430 - 492), yield of fruits (32 - 38 kg/tree), fruit density (0.87 - 0.10) and ascorbic acid content of fruits (26.1 - 32.2 mg/100 g).

Crop Protection

Two sprays of either monocrotophos 0.036% or dichlorvos 0.1% at 14 days interval reduced the leafminer damage.

PLUM

Crop Management

In the experiment on liming and P fertilization graded levels of P (0, 150, 450 and 600 g/tree) either alone or in combination with lime (0, 75 g tree/year) in 13 year old plum Cv. Hals were studied. The results indicated that lime application at 75 g per tree/year gave 5 % increased yield over unlimed trees.

Crop Protection

Neem oil 2% caused 85% mortality of the [illegible] which was on par with neem cake extract 10 per cent. Nimbecidin 0.2 % and fish oil resin soap caused 72 and 55 per cent mortality respectively at Horticultural Research Station, Kodaikanal.

OLERICULTURE

TOMATO

Crop Improvement

Promising Selections, Coordinated Vertical testing : A total of 22 entries comprising of released varieties and cultures received from different centres were tested during 1993 - 94. Among them Co - 3 recorded the highest yield of 39.25 t/ha followed by CTRS.812 with a yield of 36.21 t/ha. The lowest yield was recorded in Phule 16 (14.63 t/ha).

Crop Management

The tomato grown in a field applied with well decomposed farm yard manure at 25 t/ha in combination with Azospirillum at 2 kg/ha, phosbobacterium at 2 kg/ha and with the released of earthworm at 200 per plot of 18 sq.m. recorded the highest mean yield of 26.18 t/ha which was on par with recommended practices of FYM + inorganic fertilizers at 120 : 100: 100 kg/ha which gave an yield of 27.80 t/ha. Regarding economics of organic gardening, the sale price of organically grown tomatoes should be increased so that the cost of other inputs like biofertilizer, earthworms, etc will be compensated.

BRINJAL

Crop Improvement

Pre - release culture

A promising white fruited selection KSM 107 performed well under ART in Tirunelveli and Chidambaranar districts during 1992 - 93.

Co -ordinated varietal testing

A total of 27 entries comprising of released varieties and cultures were tested during 1993 - 94. Among them, Pusa Purple Long recorded the highest yield of 42.37 t/ha followed by APAU with an yield of 32.98 t/ha. The entry DBSR 44 recorded the lowest yield (10.85 t/ha).

Crop Management

The trial conducted in Co 2 brinjal indicated that among the treatment combinations, 25 t FYM + 100:50:30 kg/npk/HA + Azospirillum + Phosphobacterium recorded the highest yield of 36.38 t/ha.

CHILLI

Crop Improvement

Variety Released : PLR 1 : A pureline selection CAP 8 made from Kadangadu local released as PLR 1 green chillies during January 1994. The variety recorded a mean yield of 19.34 t/ha with an increase of 18.7% and 28.5% over Co 2 and local type. In the adaptive research trials conducted at 26 locations, it gave a mean yield of 17.47 t/ha with an increase of 18.3 per cent over local. This cultures performed well in the coastal soil with high salinity with p H of 8.2 and E. C. 30dsm-1 registering 19.0 tonne/ha of green chilli.

Estimation of Oleoresin content in chilli

A total number of 16 varieties of pungent chilli were evaluated for oleoresin content. The results showed that the oleoresin contents ranged from 9.20 to 14.42 per cent. The varieties LCA 206, Co. 1 and Sel. 1 had higher content of 14.42, 14.10 and 14.00 per cent respectively.

Crop Management

The trial was laid out with the variety Co. 1 for three seasons with Biozyme crop + (2 doses) with and without normal dose of fertilizers. The results indicated that three spray application of Biozyme @ 189 ml in 180 litres of water on 35, 55 and 75 days after transplanting with normal fertilizers increased the yield of dry chilli pods to an extent of 40.6% over control with a C:B ratio of 1:2.4 as against 1:2.5 in control.

Crop Protection

Spraying neem seed kernel extract 5% inhibited the feeding of *Spodoptera litura* by 75.06 per cent and neem oil 1% caused 80 per cent mortality of aphids in the lab. studies.

Bacillus thuringiensis @ 2.5 or 3.0 lit/ha significantly reduced the fruit borer damage caused by *S. Litura* and increased the yield. The treatment was also on par with the standard treatment viz., Carbaryl 2.5 kg/ha.

ONION (Aggregatum)

Crop Improvement

Evaluation of Seed propagated aggregatum onion

Taking advantage of certain local types of onion which showed free flowering and seed setting tendency, the seed production efficiency of five such local types viz., Gnanamedu (V1), Oddanchatram (V2), Mutloor (V3), Kandakadu (V4) and Thangaithittu (V5) were studied under Coimbatore conditions.

Among the five types, Type V5 (Thangaithittu) recorded maximum plant height (44.4 cm) number of leaves (15.2), shoot girth (4.9), leaf weight (13.6 g/plant), bulb weight (10.98 g), bulb girth (8.69 cm), bulb length (4.90 cm), bulb diameter (2.90 cm) and bulb yield (88.39 G / plant). The finding suggests the possibilities of multiplying the aggregatum onion through seeds and further studies are in progress to select suitable types.

ONION (BELLARY)

Effect of spacing cum fertilizers

The results indicated that the spacing of 15 x 15 cm with 100 : 150 : 75 kg NPK/ha is optimum for the new variety Agri found Light Red onion.

BITTERGOURD

Crop Management

A field trial was conducted in Co 1 variety with four levels of N, three levels of P and two levels of K. The results indicated that a fertilizer dose of 60 : 60 : 30 kg NPK/ha is optimum to get higher yields.

TAPIOCA

Crop Management

Optimum fertilizer schedule for cassava var. Co. 3 is 60 : 60: 120 kg/NPK/ha which accounted for 35.8 per cent increase in yield over control.

The mean yield of two years trial revealed that the highest tuber yield was recorded in plots received with neem coated urea (33.86 t/ha) followed by sulphur coated urea (31.58 t/ha), with increases of 33.3 and 24.3 per cent respectively over absolute control.

SWEET POTATO

Crop Management

Effect of Nitrogen and Azospirillum

The mean tuber yield over three seasons have indicated that plants treated with two third of recommended dose of N (26 kg/ha) + 2 kg of Azospirillum/ha (vine dipping + 10 kg of Azospirillum per ha soil application) recorded the e highest yield of 26.86 t/ha accounting for 23.3 per cent over recommended dose of nitrogen.

FRENCH BEAN

Crop Improvement

Variety Released

YCD 1 : This is suitable for both pod and grain. It has flat, long, broad pods with attractive dark purple bold seeds. Both pods and seeds possess high nutritive value. It has field tolerance to root rot, rust, yellow mosaic and anthracnose diseases. This variety is capable of yielding 9 t of green pods /ha and 6 t of grains /ha in 105 days duration.

PEAS

Crop Management

Under the laterite soil conditions of Kodaikanal, the bio - fertilizers enhanced the available N and P. Rhizome application increased 8% yield in peas whereas phosphobacterium increased only 3%. However, the dose of 100: 100: 50 kg NPK/ ha (with seed inoculation of rhizobium) was effective in increasing the green pod yield by 16 - 18% in moringa beans.

MORINGA BEAN

Crop Improvement

Promising Selection : A *pure line selection* 55 *selected from the germplasm* recorded a yield of 7.49 tonnes of green pods/ha while the local type yielded only 5.14 t/ha with an increase of 39.2 per cent. This bean is suitable for cultivation in the hilly regions ranging from 1300 to 2400 M above MSL.

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FLORICULTURE

ROSE

Crop Management

The rose rootstock trial indicated that among the three rootstocks viz., *Rosa indica* var. *odorata, R. multiflora* and *R. borboniana tried, Rosa indica* var. *odorata* recorded maximum percentage of bud take (80%). Budding during July, August and September registered maximum percentage success.

Plant Protection

Fish oil rosin soap 2.5% and endosulfan 0.07 effectively controlled both scale insect and aphids, while neem oil 3% and phosalone 0.07 % were effective against aphids.

JASMINE

Crop Management

In Jasminum grandiflorum, the treatments with N 45 g, P_2O_5 90 g and K_2O 120 g/plant (with Azospirillum and phosphobacterium) recorded higher yield / plant (1590.92 g).

CHRYSANTHEMUM

Crop Improvement

Out of the twelve chrysanthemum varieties tested under the varietal testing programme, the variety Red Gold has been selected for multilocational trial.

Crop Management

A trial was conducted to study the effect of integrated nutrient management in chrysanthemum Cv. Co. 1. The treatment N 90, P_2O_5 94 and K_2O 25 kg/ha along with Azospirillum and phosphobacterium @ 20 kg/ha recorded highest number of flowers, (2139) and flower weight (6363 g) per plot of 3 X 3 m size.

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Betelvine
Sirugamani
(SGM.) 1

French Bean
Yercaud
(YCD.) 1

GLADIOLUS

Crop Improvement

Promising cultures

A total of 78 accessions of gladioli were assembled and studied for their suitability to Kodaikanal conditions. From the population of American beauty, a selection namely GS 5 - 12 has been made which was later released as a variety (KKL - 1) for hilly regions of Tamil Nadu. The flowers of this selection are attractive red - purple with white flushed throat.

CAMELLIA

Crop Management

Propagation studies in Camella indicated that single node cuttings under mist registered the highest per centage of rooting (92%) followed by cuttings with two nodes (90%).

SPICES, PLANTATION CROPS, MEDICINAL AND AROMATIC PLANTS

TURMERIC

Crop Improvement

Variety Released

BSR 2 : It is a medium statured short duration variety (240 - 250 days) with a yield potential of 32696 kg/ha. It has field resistance to scale insect. Suitable for growing in the May - June season. This is a mutant from Erode local type.

PEPPER

Crop Management

A field study on fertilizer requirement indicated that application of 150, 50, 150 and 25 g of N, P_2O_5, K_2O and $MgSO_4$ per vine recorded the maximum yield of 7.10 kg of dry pepper and was found to be significantly superior.

GARLIC

Crop Management

In Ooty - 1 variety, application of N, P and K @ 125 : 90 : 125 kg/ha registered the highest bulb yield of 26 t/ha. Application of NPK at this level did not cause any rubbering and sprouting in garlic.

CASHEW

Crop Management

The foliar nutrition of urea at 4% concentration sprayed along with endosulfan, in addition to the soil application of recommended dose of fertilizers registered the highest yield of 6.35 kg of nuts per tree compared to 3.98 kg in the treatment with application of fertilizers through soil alone.

MEDICINAL AND AROMATIC PLANTS

SENNA

Crop Improvement

Among 12 cultures screened for their yield under dryland conditions, the local type therkolan (K.S.12) recorded the highest leaf yield consistently (686.7 g/20 sq.m.)

GYMNEMA

Crop Improvement

Twelve ecotypes of Gymnema were collected from various parts of Tamil Nadu and Kerala and are being evaluated.

BETELVINE

Crop Improvement

Variety Released

SGM 1: It is a high yielding (109.54 lakh leave/ha) dwarf statured vine with vigorous bushy growth. This variety has thick hairy stem with short internodes and multilaterals. The leaves possess attractive yellowish green colour with desirable pungency. It is a pure line selection from Palghat type having a duration of 2 - 21/2 years. It is suitable in January - March and June - August season in all betelvine growing areas of Tamil nadu.

Crop Management

Effect of Neem coated Urea

Neem coated urea @ 100 kg/ha recorded the highest vine elongation (35.6 cm), laterals per plant (10), leaf yield (37.08 / ha), 100 leaf weight (191.69) and keeping quality (16.3 days) and least per cent disease incidence (12.9).

HOME SCIENCE

Changes in the trace minerals profile of rice after cooking in different metal utensil was studied at Madurai. The rice was cooked by the boiling and absorption method in different utensils viz., stainless steel; aluminium and hindalium. The trace minerals like Fe, Al, Cr, Ni, Cu, Zn and Pb were analysed before and after cooking the rice. On cooking in different utensils the trace minerals values were increased significantly in all the rice samples. Large increase in Fe values were observed in the rice samples cooked in low quality stainless steel vessel (8.42 mg) and in low quality aluminium vessels (8.30 mg). The maximum mean Al values were registered when the rice samples were prepared in aluminium vessels of low and medium quality (25.38 mg) followed by Indalium low quality vessel (24.00 mg). Rice cooked in stainless

steel vessels showed higher Cr and Ni content than in the other vessels and the values ranged from 1.52 to 2.76 and from 2.06 to 3.10 mg/100 g respectively. It was also observed that the low quality stainless steel vessel leached the maximum quantum of Cu, Zn and Pb when rice was cooked in it.

Preparation of sago vadagams using soya was taken up at Madurai. Traditional foods like appalam and vadagam from very important adjuncts to our south Indian meals. Vadagams are generally prepared with rice or sago along with spices. In this study soya flour has been introduced in sago vadagam in order to increase its nutrient quality. The preparation involves the following steps; Pressure cooked sago soaked overnight for 15 min, defatted soyaflour mixed in little water and added to cooked sago, added cumin seeds and salt, boiled for 5 min, cooled and poured over damp cloth to sundry for 3 to 4 days, removed from cloth and again sun dried for 1 day and packed in polythene bags for storage.

This product was found to be very acceptable upto 30% soya flour incorporation. It had a pale yellow colour when large globules of sago were used. Its taste and flavour was judged to be good. On frying it had good puffing characteristics. On storing in polythene bags the vadagams retained its good quality even after 9 months. Every 100 g of this product contain 14.8% protein and can supply 320 calories. This can be recommended as special nutritious supplement for children. Soya consumption can also be thus popularised.

Studies on simple on-farm techniques for the accelerated ageing of freshly harvested rice were taken up at Madurai. Freshly harvested IR 20 and ADT 36 rice varieties were placed in tins (16 Kgs) The tins were costed with black board paint on the outside and on the lids to enhance their heat absorption. Water (50 ml) was placed in closed cups provided with perforated lids on the surface of the rice. The tins were placed directly under the sun from 8.00 AM to 5.00 PM. The experimental set up provided moist heat which resulted in the accelerated ageing of rice in ten days (Normally it will take atleast 3 to 4 months for natural ageing). In this simple on farm technique, the cooking parameters and organoleptic properties improved to a very great extent and the rice was better than the naturally aged (90 days) rice. There was no insect attack or off-flavour development during storage in the accelerated aged rice, because of keeping them in closed moist atmosphere for 10 days under the sun.

Studies on the stability of B-carotene and ascorbic acid during processing and storage of some south Indian vegetable dishes were undertaken at Madurai. *Sambars, Porials* and *Kootus* were prepared using six different vegetables by three different

cooking methods (open, pressure and microwave cooking) and the loss of B-carotene and ascorbic acid were assessed both due to preparation and due to storage. ***Sambars*** were found to results in more loss of B-carotene (3.13 to 34.63%) whereas, preparation of *Kootu* resulted in higher losses of ascorbic acid (20.92 to 67.29%). The loss of ascorbic acid was higher than that of B-carotene in all the recipes. During storage, there was a progressive loss of both the vitamins and significant loss occurred after storage for 6 hr at room temperature.

Studies on the processing of dehydrated food product from coconut were taken up at Madurai. Coconut could be used for preparing dehydrated product by employing the following steps like dehusking, deshelling, removing tests, cutting into pieces, blanching in boiling water for 10 min, cooking in sugar syrup (35° bx) until the syrup reached 75° bx or soaking in syrup (20° bx) and drying (60°C for 6 hr). The coconut kernel from which the top layer was peeled produced good quality product with respect to colour. The dried product contained 8.38 g% moisture. It had an acceptability score after 60 days of storage at room temperature in 100 guage polythene bags. From the dehydrated coconut product, products like coconut crisp and cocount pulse, flour mix were developed and the organoleptic tests revealed acceptability score of the respondents.

FORESTRY

The influence of agro-ecozones on oil content in the neem of Tamil Nadu was studied with thirty three pheno - typically superior trees from six different agroecozones and were assessed for their oil content. It ranged from 35.5 to 43.1 % on Kernel basis. The highest mean oil content was recorded by high rainfall zone with a value of 40.04% followed by north - western zone 39.8%, southern zone 39.62%. Western zone 38.41% and north - eastern zone 38.93%. The least mean value of 38.08% was recorded in the Cauvery delta zone. On an individual tree basis the highest oil content of 43.58% was recorded from Alangulam area of southern zone, followed by Erode with 43.0% and Panruti of north eastern zone with 42.2%.

Effect of different soil types on azadirachtin and mineral constituents of kernel in neem was studied utilising five soil types viz, black, red, alluvial, coastal alluvium and lateritic soils. Azadirachtin content was the highest in 3.72 g/kg in red soil followed by black 3.08 g/kg and least 2.71 in lateritic soils. While K and Ca did not vary due to soil types Mg was distinctly superior in alluvial soil. However, on individual location basis, seeds collected from Bannari (Periyar) recorded a high Azadirachtin content of 10.0 g/kg followed by Tiruppathur (N. Arcot) with 8.10 g/kg.

Studies on the effect of five different soil types on the oil content and seed mineral constituents in pungam on the oil content and seed mineral constituents in pungam revealed that trees growing on coastal alluvium were characterised by maximum oil content of 37.5 per cent. Considering mineral constituents, lateritic soil proved promising.

Effect of seed size on viability and storability in pungam was studied by collecting kernels from 15 year old wood lot at Tirupur were resolved into three size classes of small, medium and large and evaluated for viability, vigour and storability. Large sized seeds had not only higher germinability (51%) but also the highest vigour index. On storage, however both small and large seeds showed a decline in germination at the end of 3 months; but in medium sized seeds it was at the end of 2 months itself.

Studies on seed fortification were taken up in *Acacia nilotice* which is characterized by seed - coat dormancy and was fortified with different chemicals including cowdung slurry as a treatment. Though several treatments enhanced both viability and vigour, distinctly superior results were obtained only with 2% KNO_3 recording 86 per cent germination as compared to water soaking 56 per cent.

Six tree species viz. *C. equisitifolia, A.lebback, Azadirachta indica, A. nilotica, D. sissco* and *A. mellifera* were evaluated for their tolerance to alkaline soils (pH 9.14; ESP : 30). Relative to normal soil, growth under alkali soils was depressed in all species but the magnitude of reduction was the least in neem. Incorporation of amendment viz., pressmud @ 5 g/plant proved promising for *Casuarina equisetifolia, Acacia indica* and *Acacia nilotica*. For *Dalbergia sissco*, gypsum @ 0.5 kg/plant enhanced in growth height. For *Albizia lebback* and *Acacia mellifera* none of the soil amendments were efficacious.

Ten tree species viz, *A.leucophloea, A.nilotica, Alibisia lebback*, Neem, Casuarina, *Eucalyptus Calandulemis, E.tereticornis, Hardwickia binata* and *Prosopis* were evaluated for their effects on soil physicochemical properties related to a barren soil. Water holding capacity and Porosity increased under all the tree species. Organic carbon increased under *Cauarina equisetifolia, Hardwickia binata* and *Eucalyptus tereticornis*. Avaialble N did so under *C.equisetifolia* and *A.nilotica*. From a holistic standpoint, *C.equisetifolia* is considered to be a desirable species in maximising soil fertility.

Economic appraisal of different land use systems viz., Agriculture (turmeric, cotton), silviculture (teak, kapok) and agrisilviculture (teak + turmeric + kapok + cotton) was conducted and the results indicated that considering a/c ratio, agriculture proved

to be the least remunerative and silviculture the most remunerative. From the standpoint the NPV which is a better yardstick for evaluating the worthiness of system, agrisilviculture had a definite edge over pure silviculture.

The returns from a few tree species under both rainfed *(Acacia nilotica, Albizia lebback, Proposis and Ceiba pentandra)* and irrigated *(Eucalyptus tereticornis Casuarina, Tectona grandis and Ceiba pentandra)* conditions were evaluated for economic appraisal of a few multipurpose trees. Under rainfed condition *Prosopis juliflora* recorded the highest NPV while it was teak under irrigated conditions.

Performance of Australian acacias on lateritic soil of Pudukkottai tract was undertaken and among *(Acacia salicina* 16648*)* did not establish . Of the rest, A. crassicarpa (13681) recorded the highest volume of 0.057 cu.m per tree, *A. holoserica* (Brooma) recorded a volume of only 0.022 cu.m. However, *A. holosericea* recorded higher survival of 76 per cent as against 40 per cent (13681). Four other provenances of *A. grassificarpa* did not perform well

AGRICULTURAL ENGINEERING

The following three gadgets/equipments were released during January, 1994 for the benefit of the farming community.

1. Spray boom for Orchard and field crops

A new spray boom attachable with a rocker or foot sprayer has been developed in the Regional Research Station, Paiyur. It has only a weight of 3 kg and can be used easily on tree crops and field crops. Spraying can be done both on upper surface and lower surface on the leaves with a droplet size of 50 microns uniformly. It costs only Rs. 125 and by using these 40 per cent of the time and 50 per cent of the spray fluid can be saved.

2. Cleaner cum grader for pulses and ragi

A manually operated rotary cleaner-cum-grader for pulses and ragi has been devised in the Regional Research Station, Paiyur. Produce from threshing floor can be cleaned and graded at a cost of Rs.2 per quintal easily. It can clean and grade 225 kgs of green gram or blackgram or ragi per hour. The unit costs Rs. 2500/-.

3. **Bush clearing machine**

A machine for clearing bushy plants like parthenium has been developed at Zonal Research Centre, Coimbatore. It is powered by a 5.4 HP diesel engine and can be operated easily by a single person. This machine can clear bushes in 4 ha per day at a cost of Rs.140/ha. This machine including engine costs Rs. 27000/-

Chisel plough: A low drought chisel plough has been developed and tested for performance. It is suitable for moisture conservation in rainfed agriculture. It is also used to break the hard pan and to increase the water intake. The salient findings are given below:

Field capacity	:	0.40 ha
Depth of operation	:	35-40 cm
Width of furrow loosened	:	30-35 cm
Moisture saved due to use of chisel plough	:	12-13% over control
Cost of the unit	:	Rs.4,000

Pregerminated paddy seeder : The pregerminated paddy seeder has cylindrical drums to sow the seeds in eight rows. The seed rate can be varied by moving the rings provided on the drums. Each drum has two rows of openings having different diameters at 20 cm spacing. The unit weighs 15 kg without seeds.

The paddy seeder was evaluated for performance in the wetlands and Paddy Breeding Station of Coimbatore campus. The salient findings are given below:

- The paddy seeder facilitates line sowing of pregerminated seeds in low lands.
- Since the crop is row-planted, the intercultural operations become easier.
- The effective field capacity of the machine is 0.9 ha/day.
- The cost of the unit is Rs.1,000/-
- Cost of operation is Rs. 270/- ha compared to Rs.1,600/ha in the manual method of line planting.

Alternate material for rubber rolls in a paddy sheller: The thermoplastic polyurethane Elastaners (TPU) has been identified as an alternate material for rubber rolls in a paddy sheller. The hardness is 96 share 'A' (hardness of rubber : 87 share

'A'). The shelling efficiency was 90 per cent as against 85 per cent in rubber roll sheller and the breakage percentage was same in both the cases.

Pepper thresher : A power operated pepper thrasher was developed and tested. The threshing efficiency was 85% at the optimum clearance of 6 mm. The capacity of the machine was 50 kg/ha and the cost of operation worksout to Rs. 50/- per quintal. The cost of the unit is Rs.10,000/- including 1 HP electric motor.

Lye-peeling of cassava: A chemical method for peeling of cassava & tubers, using sodium hydroxide solution was developed. The optimum parameters are :-

i) Concentration of solution	:	8 - 10%
ii) Temperature of solution	:	55-95°C
iii) Dipping time	:	4 to 7 minutes
iv) Peeling efficiency	:	98-100%

Tall trees sprayer for areca and coconut : A sprayer suitable for spraying liquid chemical for tall trees has been developed. The maximum height reach in 17 meters. It is portable and can be moved easily in the field. The cost of the unit is Rs.7,000/-

CENTRE FOR AGRICULTURAL AND RURAL DEVELOPMENT STUDIES

Study on the constraints to higher rice yields in different rice production environments and prioritization of rice research in Southern India was carried out at Coimbatore. The study covers the whole of Southern India. One hundred and twenty rice scientists and an equal number of extension personnel in all Agricultural University campuses and Regional Rice Research Stations in Southern India were interviewed for the above study. The yield gap was assessed.

Yield gap I arises due to differences in environment which cannot be managed in the farmer's field.

Yield gap II is the primary concern of the present study because it is the difference between actual farm yield and yield attained in On-farm experiments.

The yield gap II arises due to pests, diseases, soil and water, physiological, agronomic, genetic and socioeconomic constraints.

The important constraints in Andhra Pradesh are leaf folder, ear head bug, yellow stem borer, lodging, rice blast, weeds, brown plant hopper, salinity, water management and gall midge.

The important constraints in Karnataka are : Rice blast, yellow stem borer, leaf folder, imbalance use of fertilizer, varietal problems, ear head bug, weeds, water management, Zn deficiency and brown plant hopper.

The important constraints in Kerala are : Leaf folder, yellow stem borer, ear head bug, rice blast, gall midge, sheath blight, varietal problems, lodging water management and salinity.

The important constraints in Tamil Nadu are : Leaf folder, ear head bug, imbalanced use of fertilizer, rice blast, water management, yellow stem borer, gall midge, weeds, low fertility and lodging.

A study on the causes for fall in prices in Agricultural commodities was conducted in all the 60 clusters spread over the entire Tamil Nadu selected under the cost of cultivation scheme. The study showed that there was no fall in the price of paddy received by the farmers during 1992 - 93 as compared to 1991 - 92. The price received was Rs.357.47/qtl in 1992 - 93 as against Rs. 312.88/qtl in 1991 - 92. But the farmers expressed that the price received was not to their expectation, since there was an increase in the fertilizer price, particularly phosphatic and potash.

In groundnut, there was fall in the price received by the farmers in Dharmapuri district. The price received was Rs.518.27/qtl in 1992 - 93 as against 591.67/qtl in 1991 - 92. Due to the drought prevailed during 1992 - 93, the quality was severely affected resulting in lower price.

As regards cotton, during 1992 - 93 the price declined as compared to 1991 - 92. The price received was Rs. 939.09/qtl in 1992 - 93 as against Rs. 1135.89/qtl in 1991 - 92. This was due to comfortable stock position and bright prospects of cotton production in 1992 - 93 season.

As regards blackgram, there was a fall in price in Thanjavur district. The farmers received Rs.738.75/qtl in 1992 - 93 as compared to Rs.738.61/qtl in 1991 - 92. This was due to the fact that production of blackgram was more as the crop was raised in Samba follows. The area under samba fallow crop was more as compared to 1991 - 92.

In other crops the prices were in an increasing trend. However, due to the steep increase in fertilizer prices, they are not remunerative.

A study on the participation of rural women in development activities was conducted in Madurai East, Periyakulam and Thirumangalam blocks (representing wet, garden and dryland tracts of the district) with a sample of thousand five hundred rural women. The study showed that 33% of the rural women were employed, 55% were available for work; while 12% were not available for work. Old age, disability, need to care infants and elders in the family were the major reasons reported for remaining unemployed. Among the women eligible for work, 57% remained voluntarily unemployed due to household chores, personal unwillingness and not desired by the family, 12% remained unemployed due to perception of field problems as workers and as women and 32% remained unemployed, as they did not get work at the desired wage rate or at any wage rate.

A study on the techno-economic feasibility of soybean cultivation on a large scale in Madurai district was, conducted in Andipatti, Vadipatti, Madurai North and Madurai South showed that the mean area of sample farms was 1.5 ha and 80% of sample farmers raised soyabean as a pure crop. The cost and returns were worked out for soybean and its competing crops groundnut, gingelly and blackgram. The cost of cultivation for groundnut per ha was the highest when compared to other crops and it was least for blackgram. Net income per ha for soybean was Rs.5911 and it was higher than all its competing crops viz. groundnut Rs.5066, gingelly Rs.2733 and blackgram Rs.3099. Intercropping of soyabean with sugarcane was most profitable (Rs.5675/ha) than blackgram as intercrop (Rs.2209)

A study on the economics of production and marketing of cotton in Rajapalayam and Virudunagar taluks of Kamarajar district indicated that the 36% of the gross cropped area of the farms was raised under cotton. The yield of irrigated cotton ranged from 12 to 13 q and that of rainfed crop was 7.5 q/ha. The cost of cultivation (variable cost) or irrigated cotton was Rs.6324 per ha and that of rainfed cotton was Rs.4359 per ha. The corresponding fixed cost amounted to Rs.1753 and Rs.840 per ha respectively. The net income per ha was Rs.9575 and Rs.4190 respectively for the irrigated and rainfed cotton, while the corresponding per quintal cost of production was Rs.619 and Rs.653 respectively. Bullock labour, machine labour, potash and plant protection chemicals were found to be under utilised, indicating the scope for increasing the output of cotton by using more of these inputs. Nearly 77% of the farmers were found to store 67% of the marketed surplus and the storage loss was estimated as 2.2% of the marketed surplus. Only 19% of the marketed surplus was

stored beyond 120 days. Nearly 73% of the farmers marketed their kapas through village merchants which formed 76% of the marketed surplus. While 20% of the farmers sold their produce through commission agents which formed 16% of the marketed surplus. Only 7% of the farmers sold through regulated markets and the kapas formed 16% of the marketed surplus.

Economic viability of farm machanisation and its impact on employment of farm labour were studied. Farm machanisation improved intensity of crop production and diversification of cropping pattern.

It increased the employment of permanent and casual labour and saved family labour, but total employment of human labour increased.

On average, a farm owning tractor used it for 779.17 hours in a year. On-farm use accounted for 26.39 per cent and while custom hiring provided the major share of tractor use. The break-even point for efficient use of tractor was 925.16 hours per year. Hence, there was need to find more use for tractor. However, net return per rupee of cost, was more than Rs.1.88 for different levels of mechanisation and the benefit/cost ratio (3.92:1) showed that investment in farm mechanisation was economically viable.

A study on strategies to increase farm profit was takenup in Theni block of Madurai district. The cost and returns of major crops raised in the block showed that the per ha cost of cultivation was the highest for banana (Rs.38015) followed by sugarcane (Rs.20388), brinjal (Rs.14786) and chillies (Rs.11706). The net income per ha was the highest for banana (Rs.42527), followed by sugarcane (Rs.20232), cotton II season (Rs.18260), cotton I season (Rs.17740) and tomato (Rs.16501). The net income was the least for rainfed gingelly (Rs.1661).

A linear programming analysis of a typical farm (2.4 ha) showed that inclusion of banana along with paddy would increase the net farm income to Rs.73,000 which was higher than the existing income by 114.18 per cent. Considering the risk in raising of banana and cotton crops, the analysis indicated potentials for increasing the net income of the farm by 26.66 per cent, by altering the existing crop mix.

A study on the media usage and training needs of extension personnel in media management was taken up among sixty four extension personnel in the cadres of Assistant Agricultural Officers from Uthamapalayam and Karaikudi divisions of Madurai District. The study indicated the following:

Nearly two thirds (61 %) of the extension personnel were regular listeners to radio programme and 81% of them transferred the Agricultural information received from radio to farmers. Less than fifty per cent (42%) were frequent viewers of T&V Programmes and most of them never participated in any of the Doordharsan Programme. Nearly three-fourths of the extension personnel were found to have transferred Agricultural news from print media to the farming community. Off-campus training on media management was mostly preferred by the extension personnel. Collection, selection and arrangement of messages for various media was the most preferred area for training as felt by majority of the extension workers.

A system approach on Oilseed Technology Generation, transfer and consequential effect on growers was carried out in South Arcot district. The results indicated an effective transfer on technology from the research and extension systems to the client system. The perception of farm scientists on their linkage with and feedback received from the groundnut growers was found to be at less than the expected level. Moreover, more than half of them expressed no linkage with scientist of other research organisations. Enough staff to carry out effective coordinated research, a journal exclusively for publishing oilseed research and regular inservice training etc., were the expectations of the farm scientists in developing and spreading groundnut technologies in the state. The extension personnel perception on their linkage with other systems are feed back from the farmerwise at an expected level. Generating low cost technologies, reducing the area of operation of extension personnel and need - based timely training etc., were the expectations of the extension personnel in developing and spreading groundnut technologies in the state. Majority of the big and small farmers in both irrigated and rainfed conditions had been possessing medium level of knowledge and adoption. In general, both in irrigated and rainfed conditions education was the only variable showing maximum direct effect. A bunch type groundnut variety which is tolerant to drought during pegging to maturity phase and low - cost Groundnut seed drill and stripper were the most important technological needs of the groundnut growers. After adoption of improved groundnut varieties and technologies, increase in groundnut yield was to the tune of 66 and 57 per cent among irrigated and rainfed Groundnut growers respectively.

WATER TECHNOLOGY CENTRE

A study conducted on the improved water management practice in rice under well irrigation indicated that irrigation to 5.0 cm depth, one day after disappearance was found to be effective in maximising the use of irrigation water resulting in a saving of 35.4 per cent besides increasing the rice yield to about 15.0 per cent.

In a study carried out to find out the bio - efficacy and continuous application of herbicides under submerged conditions in rice - rice - pulse cropping systems, the results indicated that in ADT 36 and IR 20 varieties, irrigation in the day of disappearance of ponded water (I_1) registered higher grain yield (5012 kg & 5337 kg/ha) as compared to other two irrigation levels. Irrigation at 3 days after the day of disappearance of ponded water registered a net saving of 15 - 17 per cent in total water requirement over I_1. With regard to water use efficiency also I_2 was comparable with I_3 irrigation at 6 days after disappearance (5.41 and 5.59 respectively).

Hence under scarcity conditions of water supply, irrigation upto 5 cm depth 3 days after disappearance of ponded water is an efficient economical water management practices as good as irrigation on the day of disappearance of ponded water in rice based cropping system of alfisols of Tambiarparani command area.

The results of trials conducted (OFT) at Salem, Periyar and Vellore blocks with a treatment of Kaivarappu at a height of 29 cm all round the field bund inside the plot leaving a spacing of 30 cm between the main bund indicated that the water used under control plots (without provision of kaivarappu) was higher in all the three locations recording 162.0, 165.0 and 152.5 cm as against 123.5, 124.0 and 115.0 cm of water treatment plots resulted in a water saving of 23.8, 24.8 and 24.6 per cent in the above blocks respectively.

In the study of productivity per unit of water under various land use mixes, it was evident that well irrigation recorded the maximum out put per unit quantity of water due to effective utilisation of water. Higher productivity and profit per unit of water was observed in Periyar district than Salem. In general performance of tank system was comparatively poor than well irrigation and canal system. Canal system was closely followed by well irrigation. Among different canal systems, Lower Bhavani (Arachalur) recorded the maximum product and profit per unit quantity of water and required minimum water to produce unit quantity of product.

Application of coir waste at 10 t/ha as mulch resulted in saving of about 16 percent water with a yield increase of 14 per cent.

The improved water management practice of applying 5.0 cm of water irrigation through ridges and furrows recorded a saving of 24 per cent water with a yield increase of 9.4 per cent in Co 2 groundnut.

Application of 0.5% KCl recorded the highest grain yield of 1150 kg/ha in soybean. Besides the boron or aluminium at 0.3% during water stress conditions alleviates the ill effects of drought by recording 1080 and 1080 kg/ha respectively as compared to control 990 kg/ha.

Among the methods of irrigation ridges and furrows at 0.8 among the methods at 0.8 IW/CPE ratio was found to better than flat bed, along with application of composted coir waste at 12.5 t/ha.

The on-farm trial was conducted at Puduchatram village in Puduchatram block of Salem district on paired row furrow irrigation on water economy in cotton (LRA 5166) under well irrigation in addition to the farmers' method of irrigating under normal ridges and furrows. The results showed that the paired row furrow method of irrigation saved 28 per cent water without any loss in seed cotton yield. The water use efficiency was higher under paired row furrow irrigation method.

The on-farm trial conducted at South Bothanam village of Udumalpet block on improved water management practice was conducted and the following conclusions were drawn.

a) The depth of 5.0 cm water under all furrow and alternative furrow saved 34.9 percent and 57.1 per cent respectively when compared to farmers' practice.

b) The cane yield was 117.0 t/ha under all furrow irrigation, 105.0 t/ha under alternate furrow and 115.0 t/ha under control indicating that application of higher depth of water per irrigation did not influence the cane yield.

c) Irrigation to 5.0 cm depth, through normal ridges and furrow method recorded higher yield, with a water saving upto 34.90 percent, compared to control.

d) Irrigation to 5.0 cm depth through alternate furrow irrigation registered lower cane yield (105 t/ha) accounting to about 10 % yield reduction compared to 5.0 cm depth of water through all furrow method.

The experiment (OFT) was conducted under well irrigation at Kurumpapalayam village of Perur taluk, with 5.0 cm depth of irrigation water to all furrows and alternate furrow irrigation coupled with the use of composted coir pith at 10 t/ha in variety Co3.

The results revealed that there was a saving of water to the tune of 42% under all furrow and 59.8 % under alternate furrow with composted coir pith compared to control. The highest yield of 2463 kg/ha under all furrow irrigation followed by control (2387) and alternate furrow was found to record the least (2185 kg/ha).

The seepage losses in the Lower Bhavani Project Channel systems were assessed. The seepage losses in main canal varied from 17.1% to 9.3% from head to tail, in distributories the losses varied from 13.7% to 16.3% from head to tail and in field channels the seepage losses varied from 9.6% to 13.8% from head to tail reaches.

The result of the experiment conducted at Bhavanisagar during 1993 with 6 different irrigation regimes and four different levels of N in banana in red non calcareous soil revealed that the highest fruit yield of 22.3 t/ha was recorded under irrigation at 1.0 IW/CPE ratio from 0-7 months and 1.20 IW/CPE ratio from 7-14 months with gradual widening of furrow. With regard to N, 150% of recommended dose gave higher fruit yield (22.7 t/ha) and it was comparable with 125% of N (21.2 t/ha).

5. EXTENSION EDUCATION

The Directorate of Extension Education and the various extension education centres of TNAU are engaged in the transfer of technology emerging from the research programmes of the University. The details regarding the extension education activities of the Directorate of Extension Education are furnished in this chapter.

Krishi Vigyan Kendras

The four Krishi Vigyan Kendras at Coimbatore, Madurai, Trichy and Vridhachalam conducted on-campus and off-campus training programmes on agriculture and allied activities. About 414 training programmes were conducted and the beneficiaries included 7733 farmers, 3560 farm women, 1368 extension workers, 75 youths and 331 other categories of personnel. In addition these centres carried out 178 method demonstrations, 57 group/village meetings, 24 farm/field days, 5 farmers' days, 526 farm advisory services and answered 3192 farmers' queries. Besides these, 60 articles were published in dailies and farm magazines. 99 radio and TV programmes/ announcements were broadcast/telecast for the benefit of farming community. For reference, 139 Extension Literature/Publications were brought out. Slide shows numbering 42 were screened and 32 exhibitions and 42 campaigns were organised as part of their mass media utilisation activity.

Plant Clinic Centres

The scientists of the five plant clinic centres at Vrinjipuram, Salem, Tirur, Killikulam and Srivilliputhur periodically visited the farmers' holdings, identified pests and diseases problems and suggested suitable remedial measures. These clinics also organised programmes for on-farm testing of pre-release cultures of various crops, management practices and plant protection methods besides undertaking surveillance work for the purpose of forecasting the outbreak of pests and diseases. Evolving prediction formulae for important pests and diseases and conducting case studies were the other activities of the plant clinic centres. The Plant Clinic Centres carried out 54 trainings on integrated pest management and the beneficiaries were 1270 farmers, 84 farm women and 946 extension workers. Besides individual and group contacts, 29 skill demonstrations, 83 group/village meetings, 18 farm/field days and 3 farmers' days were conducted. These centres also organised 503 farm advisory services, answered 212 farm queries, published 50 articles in dailies and farm

magazines, broadcast/telecast 58 programmes, released 15 publications and organised 11 slide/film shows, 4 exhibitions and 8 campaigns.

Communication Centre

The Communication Centre at Tamil Nadu Agricultural University main campus, Coimbatore disseminated the innovations of the University by various methods. They are in the form of answering 3560 farmers' queries, writing 70 articles in dailies/farm magazines, 4 radio programmes, 56 TV programmes, 35 slide film shows and 3 exhibitions. Nearly 2800 people visited the central museum and central exhibition and they were benefited. The communication centre also conducted distant learning programmes like farm school on All India Radio and correspondence courses.

Distant Learning Programmes

1. Farm School on All India Radio

During the period under report courses on agriculture and its allied activities, kitchen gardening, new approaches in edible mushroom cultivation, agro based industries, commercial flower cultivation and coconut cultivation were held. Nearly 307 registered farmers and thousands of other farmers were benefited. One day contact programme was conducted for the courses to give practical training on subjects concerned by organising skill demonstration, exhibition, group discussion etc.

2. Correspondence Courses

Correspondence courses on grape cultivation and flower cultivation were organised from April to June 1993, Growth regulation and micronutrients were organised from July to September 1993, Fruit and ornamental plant production methods and ornamental gardening and lawn making from October to December 1993 and from January to March 1994 Fruit and vegetable preservation and Dryland orchards were conducted. Nearly 689 farmers were enrolled and they were benefited. The registered participants were given certificates during the three day contact programmes.

Cassette lessons

Audio cassette lessons on Dry farming techniques were prepared during the period under report. Sixty eight recorded cassettes on coconut cultivation, tapioca, paddy sericulture, fruits (part I, II & III), forage crops, turmeric, mushroom, cardamom, pepper and sugarcane cultivation were distributed to the farming community.

Video Production Unit

The Video Production Unit involved in the production of video programmes on agriculture and allied activities in addition to the programmes for telecast through Doordarshan Kendra, Madras. During the period under report 88 programmes were covered. About 157 video lessons were duplicated and sold. Fiftaen video shows were arranged. Further, video coverage was arranged during the important functions of the University.

Training Unit

The training unit of the Directorate of Extension Education conducted 66 training programmes benefiting 1281 participants. The participants were extension personnel from State Department of Agriculture, NDDB, Sericulture, bank officials, administrators, defence personnel, scientist of TNAU and housewives.

Periodicals

1. TNAU Newsletter

This is a monthly journal published by the Directorate of Extension Education. Through this the latest research findings and various extension activities were highlighted regularly and sent to all the Agricultural Universities, selected research organisations, development departments and scientists in India and abroad. At present 350 copies are printed and distributed.

2. Valarum Velanmai

This is a Tamil monthly journal of the Directorate of Extension Education having 10000 subscribers. Efforts are taken to increase the circulation of Valarum Velanmai by enrolling some more life subscribers. Special issues on pulses, cotton, vegetable and water management were brought out.

3. TNAU Seithi Madal

This is a Tamil Monthly Newsletter disseminating the technologies in agriculture and allied subjects relevant to the season, variety and crops among the farming community and other officials of the development departments of the State. This Seithi Madal also carries important aspects such as seasonal and location specific recommendations, new findings, forecasting of pests and diseases, climatic changes and their impact etc. and functions as an effective tool in the transfer of technology.

At present 1700 copies are printed and distributed to the Convenors of the Farmers Discussion Groups of Krishi Vigyan Kendras, Farmers' Training Centres and officials of the development departments of the State.

Agricultural Information Service

The regular flow of information is ensured to the extension workers and farmers through the Agricultural Information Service which is functioning at the main campus. On all Wednesdays timely and need based messages were processed with the help of scientists and disseminated through all mass media. Besides this, this centre also issues daily press notes highlighting the ongoing activities of the University. During the period under report 6500 visitors received information from Agricultural Information Service. Every Wednesday has been identified as the contact day for farmers. Proper/ regular counseling was given to the farmers with the held of Heads of Departments and the Directors.

The message processed and sent to various media during the period under report are as follows:

Departments

1.	Agronomy	55
2.	Soil Science	16
3.	Agrl. Entomology	10
4.	Plant Pathology	2
5.	School of Genetics	22
6.	Nematology	5
7.	Seed Technology	40
8.	Forage Crops	2
9.	Agrl. Economics	8
10.	Sericulture	2
11.	Agrl. Processing	2
12.	Oil Seed	3
13.	Horticulture	1
14.	Agrl. Extension	1
15.	Micro Biology	1
16.	Water Technology	2
	Total	170

Other activities

Press Notes	180
Engagement Column	244
Farmers' queries (in person) answered	3410
Wednesday meetings	48
Replies sent to farmers queries	110

First Line Demonstration

The First line demonstrations on oil seeds and pulses were started in 1990-91 with the grant of ICAR, New Delhi. The objective of the scheme is to establish the potential of improved technology in increasing the productivity of oilseeds and pulses through profitable input management, timely operation, reducing harvesting and post harvesting losses and human drudgery in agricultural operation. The demonstration will be carried out for a period of two years with the same farmers. The demonstrations were organised for the oilseed crops like groundnut, sesamum, sunflower and soybean and pulses like greengram and blackgram in a block of 5 ha area.

Table I Number of Trainings conducted

Sl. No.	Centre	No. of of training	Beneficiaries (Number)				
			Farmers	Farm	Extn.	Youths	Others
1.	KVK, Coimbatore	102	2566	1098	90	75	3
2.	KVK, Madurai	81	1538	410	185	–	–
3.	KVK, Trichy	101	1666	717	1006	–	–
4.	KVK, Vridhachalam	130	1963	1335	93	–	328
5.	PCC, Vrinjipuram	6	100	–	25	–	–
6.	PCC, Salem	9	135	–	100	–	–
7.	PCC, Tirur	14	364	20	232	–	–
8.	PCC, Killikulam	29	571	64	539	–	–
9.	PCC, Srivilliputhur	6	100	–	56	–	–

Table II Individual / Group Contact

S. No.	Centre	Method Demonstrations	Village Meetings	Farm/ field days	Farmers Day	Farm Advisory services	Queries answered
1.	KVK, Coimbatore	42	25	5	1	25	312
2.	KVK, Madurai	14	13	7	2	102	143
3.	KVK, Trichy	26	17	6	1	162	66
4.	KVK, Vridhachalam	96	2	6	1	237	2671
5.	PCC, Vrinjipuram	5	21	–	2	63	5
6.	PCC, Salem	4	3	4	–	48	36
7.	PCC, Tirur	3	8	4	–	116	50
8.	PCC, Killikulam	–	28	–	1	141	60
9.	PCC, Srivilliputhur	17	23	10	–	135	61

Table III Mass Media Utilisation Programme

Sl. No.	Centre	Writing to Dailies & Farm Magazines	Radio/TV Progra-mmes	Publi-cations brought out	Slide/ film shows	Exhibitions	Campaign/ Seminars
1.	KVK, Coimbatore	13	35	9	20	9	18
2.	KVK, Madurai	17	28	102	3	7	8
3.	KVK, Trichy	15	24	15	10	7	7
4.	KVK, Vridhachalam	15	12	13	29	9	9
5.	PCC, Vrinjipuram	4	10	1	–	–	–
6.	PCC, Salem	12	11	2	–	–	4
7.	PCC, Tirur	5	16	2	1	1	1
8.	PCC, Killikulam	17	10	8	10	3	3
9.	PCC, Srivilliputhur	12	11	2	–	–	–

APPENDIX I

IMPORTANT CIVIL WORKS COMPLETED

1993 - 94

1. Water supply arrangements, Ambasamudram
2. Cycle shed, Ambasamudram
3. Irrigation facilities, Ambasamudram
4. Drying yard cum shed, Bhavanisagar
5. Net house, Coimbatore
6. Pollination chamber, Coimbatore
7. Drying yard, Killikulam
8. Seed processing shed, Killikulam
9. Temporary shed, Killikulam
10. Cycle shed, Killikulam
11. Drain for hostel block mess, Killikulam
12. Road to hostel block, Killikulam
13. Road in New Area, Killikulam
14. Chain link fencing, Kodaikanal
15. Foot path, Kodaikanal
16. Staff Quarters, Kumulur
17. Students hostel, Kumulur
18. Multipurpose building, Kumulur
19. Basket Ball Court, Kumulur

20. Barbed wire fencing, Kumulur

21. Threshing floor, Kumulur

22. Drying yard, Kumulur

23. Library building, Madurai

24. First floor over stack room, Madurai

25. Desilting Chittankulam tank, Madurai

26. Kitchen cum Dining Hall, Madurai

27. Barbed wire fencing, Melalathur

28. Vehicle shed, Mettupalayam

29. First floor over NARP Laboratory, Periyakulam

30. Farmers' hostel, Periyakulam

31. Cycle shed, Periyakulam

32. Refreshment hall, Periyakulam

33. Field laboratory, Periyakulam

34. Students' field laboratory, Periyakulam

35. Ground level water tank, Periyakulam

36. Threshing floor, Periyakulam

37. Screen house, Palur

38. Barbed wire fencing, Sirugamani

39. Threshing floor, Sirugamani

40. Barbed wire fencing, Thadiyankudisai

41. Contour stone wall, Thadiyankudisai

42. T & V shed, Tirur

43. Conference hall, Tirur

44. Screen house, Tirur

45. Lab-cum-office building, Tirur

46. **Hostel for farm women trainees, Trichy**
47. **Teachers Hostel, Trichy**
48. **Barbed wire fencing, Vijayanagaram**
49. **Retaining wall and road, Vijayanagaram**
50. **Barbed wire fencing, Vridhachalam**
51. **Seed processing shed, Vridhachalam**
52. **Drying yard, Vridhachalam**
53. **Vechile shed, Vridhachalam**

APPENDIX - II

LIST OF SCHEMES

University Research Schemes - Plan

		1993-94 Revised Estimate (Rs. in Lakhs)
1.	Scheme for starting post-graduate diploma in Plant Protection, Coimbatore	3.97
2.	Scheme for the establishment of an advance centre for soil and crop management studies, Coimbatore	2.41
3.	Scheme for strengthening of training division in the Directorate of Extension Education, Coimbatore	1.05
4.	Scheme for strengthening of Estate Office, Coimbatore	3.09
5.	Scheme for starting of M.E.(Ag) in Post-harvest Technology, Coimbatore	0.20
6.	Scheme for strengthening of Radiation Research, Coimbatore	2.02
7	Scheme for strengthening the Directorate of Research, Coimbatore	4.07
8.	Micro-propagation of horticultural crops, Coimbatore	0.85
9.	Development of suitable strains of Azospirillum for commercial crops, Coimbatore	1.31
10.	PG. Education and training programme leading to M.Sc degree in Bio Technology, CPMB	5.50
11.	Exploitation of hybrid vigour and development of superior hybrids in redgram, Coimbatore	1.28
12.	Biological control of soil borne plant pathogens, Coimbatore	0.84
13.	Studies on the role of VA-Mycorrhizal fungus in the establishment of P-Nutrition of Agricultural and Plantation Crops, Coimbatore	0.30

14.	Establishment of Video-Library, Coimbatore	1.21
15.	Water Technology Centre, Coimbatore	18.10
16.	Starting of post-graduate programme leading to M.B.M., Coimbatore	3.36
17.	Mitochondrial DNA and proteins in cytoplasmic male steriles in Sorghum, Coimbatore	0.87
18.	Development of monoclonal antibodies for RTV in rice and CMV and BTV in banana, Coimbatore	1.48
19.	Scheme for the establishment of a Centre for Sericulture, Coimbatore	3.60
20.	Scheme for strengthening post-graduate teaching and research in agricultural marketing management, Coimbatore	1.97
21.	Scheme for establishment of an Advance Centre for Studies on Plant Protection, Coimbatore	3.44
22.	Management of virus diseases of horticultural crops, Coimbatore	1.14
23.	Remote Sensing Unit-Agricultural Applications, Coimbatore	4.19
24.	Faculty of Forestry, Coimbatore	5.86
25.	Strengthening foliar diagnosis research to alleviate nutritional and physiological disorders in crop plants, Periyakulam	1.80
26.	Studies on the improvement and management of sweet oranges, Periyakulam	0.80
27.	Studies on the decline in the yield of grape, banana, tomato and brinjal due to nematode and fungus complex, Periyakulam	2.54
28.	Horticultural College and Research Institute, Periyakulam	.
29.	Agricultural College and Research Institute, Kumulur	64.05
30.	Survey and management of pests of forests and forage trees, Mettupalayam	0.96
31.	Tissue culture technique for forest trees, Mettupalayam	1.55

32.	Isolation and popularisation of superior genotypes of match wood trees, Mettupalayam	
33.	Forest College and Research Institute, Mettupalayam	0.50
34.	Agricultural College and Research Institute, Killikulam	1.89
35.	Research on dry land horticultural crops in red soil tract, Killikulam	1.89
36.	Establishment of Seed Technology Unit, Killikulam	2.75
37.	Scheme for strengthening and coordinating rice virus disease and mycoplasma diseases, Madurai	2.33
38.	Scheme for development of Seed Technology Unit, Madurai	2.45
39.	Establishment of Centre for Nematode Pests of Crop Plants, Madurai	1.89
40.	Studies on processing technology for soya based foods, Madurai	1.01
41.	Teaching science and technology to farm women through video cassettes, Madurai	1.10
42.	Scheme for strengthening and coordinating rice entomological research, Madurai	3.30
43.	Scheme for strengthening of research on chemistry of submerged soils, Aduthurai	1.04
44.	Scheme for the production of breeder seed in paddy, Aduthurai	3.12
45.	Scheme for commercial exploitation of heterosis in rice, Aduthurai	1.09
46.	Evaluation of scented and non-scented rices, Aduthurai	0.84
47.	Scheme for the establishment of Regional Research Station, Aruppukottai	9.48
48.	Scheme for upgradation of Tamil Nadu Rice Research Institute and Reorganisation of the set up of Directorate of Research, Aduthurai	3.01
49.	Studies on seed crop management practices under dryland conditions, Aruppukottai	0.73
50.	Scheme for breeder seed increase, Bhavanisagar	4.64

51.	Establishment of a seed complex including seed health testing and training, Bhavanisagar, Mettupalayam	2.26
52.	Scheme for upgrading the Sugarcane Research Station, Cuddalore	4.46
53.	Technology development of wasteland reclamation in coastal area, Cuddalore	3.18
54.	Evolving new varieties and technology for higher productivity in Casuarina, Cuddalore	1.55
55.	Establishment of laboratory for survey and research on Golden Nematodes of Potatoes, Vijayanagaram, Uthagamandalam	3.30
56.	Scheme for investigation on the management of pests and diseases of hill fruit and vegetable crops of the Nilgiris, Uthagamandalam	2.04
57.	Studies on drought climatology, Trichirapalli	0.79
58.	Sub-project for strengthening the Horticultural Reseach Station, Thadiyankudisai	7.87
59.	Scheme for improvement of groundnut suitable for rainfed areas, Tindivanam	1.21
60.	Operational research on pests and diseases management in rice, Kattuthottam, Thanjavur	1.59
61.	Bio-fertilizer research on forest system in Western Ghats, Kodaikanal	0.94
62.	Scheme for development of breeder seeds in millets, Kovilpatti	2.36
63.	Scheme for vegetable seed production, Palur	2.33
64.	Scheme for improvement of brinjal varieties for North and Western Regions of Tamil Nadu, Palur	1.23
65.	Scheme for the improvement of chillies in southern districts of Tamil Nadu, Paramakudi	2.99
66.	Mass production and quality control of bio-fertilizers, Palyur	0.63
67.	Scheme for formulation of improved agro-techniques in grapes suitable for Dharmapuri, Paiyur	1.39

68.	Sub-project for strengthening the Regional Research Station, Paiyur	7.54
69.	Scheme for strengthening of seed production programme, Pattukottai	0.75
70.	NARP Sub-project at Thirupathisaram	1.65
71.	Banana Research Station, Virinjipuram, Vellore	5.24
72.	Scheme for the establishment of Agricultural Research Station, Vellore	4.28
73.	Development of sorghum varieties for various industrial purposes, Vellore	1.59
74.	Causes of button shedding nut strinking and ill filling in coconut, Veppankulam	0.92
75.	Scheme for strengthening of coconut research in Thanjavur district, Veppankulam	3.09
76.	National Pulses Research Centre, Vamban	5.48
77.	Scheme for breeder seed production in groundnut, Vamban	1.63
78.	Scheme for strengthening Plant Clinic Centres at Vellore, Tirur, Killikulam, Srivilliputhur and Salem	8.58
79.	Scheme for research on improvement of cultivation of Palmyrah Palm, Srivilliputhur and Killikulam	4.31
80.	Scheme for research on intensification of medium staple cotton, Srivilliputhur, Kovilpatti and Aduthurai	4.52
81.	Scheme for research on introduction of new tree species, Coimbatore, Mettupalayam, Vamban and Killikulam	2.11
82.	Scheme for popularisation of agricultural implements through Krishi Vigyan Kendras, Coimbatore and Madurai	1.84
83.	Scheme for improvement of forage grasses and legumes and pasture development, Aruppukottai and Paiyur	2.67
84.	Scheme for seed production and seed storage studies on sub-tropical and temperate crops, Periyakulam (Kodaikanal and Thadiyankudisai sub-centres)	1.74

85.	Scheme for strengthening of breeder seed programme at Vridhachalam, Tindivanam and Kattupakkam	7.09
86.	Scheme for multiplication and distribution of pulses, Vamban, Tindivanam, Coimbatore	7.79
87.	National Agricultural Research Project, Cauvery Delta Zone, Aduthurai and Trichirapalli	11.26
88.	Sub-project for strengthening Regional Research Station, Vridhachalam, Cuddalore, Tindivanam and Kattupakkam	7.00
89.	Sub-project for strengthening Regional Research Station, Aruppukottai, Srivilliputhur and Pudukottai (Vamban)	17.42
90.	Scheme for Establishment of Regional Laboratory at Trichirapalli, Paiyur and Yercaud	6.59
91.	Krishi Vigyan Kendras, Coimbatore and Madurai	12.86
92.	Scheme for starting bio-fertilizer production and quality control unit, Coimbatore and Madurai	2.68
93.	Scheme for the development of sugarcane at Madurai (Sirugamani) and Melalathur	1.62
94.	Development of extra rice variety, Aduthurai	0.63
95.	Evolving chilli varieties resistant to mosaic and thrips, Killikulam	0.70
96.	Programming for diversified production activities for dryland and wasteland, Pudukottai (Vamban)	0.70
97.	Strengthening of the department of bio-energy, Coimbatore	3.13
98.	Molecular diagnosis kit for early detection of bunchytop of banana, Thadiyankudisai	1.25
99.	Evaluation of greengram and redgram genotypes for table purpose, Vamban	0.50
100.	Setting up a pilot plant for fruits and vegetable based processing industry, Periyakulam	1.80

101.	Management practices for bamboo under irrigated conditions, Mettupalayam	0.65
102.	Tree improvement in exotic species for wood based industries, Mettupalayam	1.60
103.	Rice technology development, management and utilisation - A farming system approach, Aduthurai	2.20
104.	Developement of varieties resistant to rice blast, sheath rot and ragi blast using tissue culture, Coimbatore	1.51
105.	Development of pheromones for major pests of rice and cotton, Coimbatore	1.20
106.	Season specific seed production technology for the development of seed districts in generating quality seed for yield maximisation, Aduthurai	1.60
107.	Scheme for exploitation of male sterile lines for developing hybrid cotton, Coimbatore	0.48
108.	Agro-forestry system for sloppy lands, Uthagamandalam	0.75
109.	On-farm trials on improved technologies developed for crops grown in Salem and Dharmapuri districts, Salem	2.20
110.	Variety Release Award	1.00
111.	Creation of an Endowment Planning, development and evaluation cell, Coimbatore	
112.	Development of wastelands of Pasumpon Muthuramalingam and Ramanathapuram Districts through Crop Husbandry, Agro Forestry and Horticultural Crops, Ramanathapuram	4.09
113.	Identification of efficient strains of micro organisms and development of processes for bio conversion of farm wastes, and urban wastes, Cuddalore	1.20
114.	Physiological studies on salt tolerance and development of rice varieties tolerant to coastal and inland salinity at RRS, Tirur	2.01

115.	Scheme on Strengthening Research on Medicinal and Herbal Plant in the Plains (Killikulam) and Hills (Yercaud)	2.70
116.	Setting of agro based industry for processing vegetables, jack, sugarcane and coconut, Horticultural College and Research Institute, Periyakulam	2.00
117.	Pollution due to Tannery, Cement factory, Paper Industry and Sugar factory and development of technology to over come the problems, AC & RI, Killikulam	2.74
118.	Scheme for maximising yield of rainfed crops in red soils of Dharmapuri district at Regional Research Station, Paiyur	1.00
119.	Scheme for delineation of pollutants in Uyyakondan River and identification of crop varieties and technologies to over come the problem in Tiruchi, Tiruchi	1.85
120.	Standardisation of vegetative propagation techniques in tree species at ARS, Thadiyankudisai	
121.	Advanced centre for Training in Water Management, Coimbatore	3.96
122.	Development of hybrid sesamum for irrigated uplands, RRS, Vridhachalam	1.08
123.	Scheme for development of rice fallow pulses for Nellai Kattabomman and Chidambaranar Districts, RRS, Ambasamudram	0.70
124.	Development of maize varieties for industrial purpose, Agrl. Research Station, Bhavanisagar	1.16
125.	Development of Management practices for high productivity in oil palm (*Elaein guineensis*), Sugarcane Research Station, Sirugamani	2.87
126.	Source - sink relationship for improving productivity in Tapioca, Vegetable Research Station, Palur	0.89
127.	Establishment of a model mechanised rice based farm in Cauvery Delta, Tamil nadu Rice Res. Institute, Aduthurai	2.78
128.	Management of Pomegranate fruit borer, CPPS, Coimbatore	0.46

129.	Management of Phytonematodes through bio-control and cultural practices in turmeric Agrl. Research Station, Bhavanisagar	0.96
130.	Scheme for research on Arid Zone Fruit crops, Kumulur	1.83
131.	Crop improvement in some bulbous ornamentals and standardisation of their cultural requirement for cut-flower production Horticultural Research Station, Kodaikanal	1.83
132.	Scheme for research on Orchids and Anthuriums for export trade, varietal development, propagation management and commercialisation Horticultural Research Station, Yercaud	1.28
133.	Study on the salt encrustation problems in conveyance pipes and measures to tackle them, Water Technology Centre, Coimbatore	0.74
134.	Studies on processing and packaging of mushrooms, Coimbatore	3.07
135.	An assessment of Potential for expanding production, processing and export of horticultural commodities - Coimbatore	0.77
136.	Study of potential and application of plasticulture in Agricultural production, Coimbatore	4.58
137.	Shifting of Engineering College - Establishment of the Departments viz. Farm Machinery, Soil and Water Conservation, Agricultural structure and Bio Energy, Kumulur	10.00

Non Plan Schemes

1.	Scheme for improvement of sunflower in Tamil Nadu, Kovilpatti	2.85
2.	Scheme for coordinated agronomic experiments on sugarcane, Cuddalore	4.98
3.	Scheme for research on nematode parasites of sugarcane crop, Cuddalore	
4.	Scheme for biological testing of pesticides laboratory, Vamban, Kovilpatti, Aduthurai and Tindivanam	6.10
5.	Scheme for improvement of groundnut through induction of mutation, Coimbatore	1.28
6.	Scheme for studies on the residues of pesticides in plant and soil, Coimbatore	3.31
7.	Scheme for research on citrus-dieback, Killikulam and Coimbatore	1.53
8.	Scheme for improvement of redgram and soybean, Vamban	2.85
9.	Scheme for evolution of cumbu resistant to grean ear and ergot diseases, Vamban, Kovilpatti	4.06
10.	Scheme for intensification of pulses research, Vamban	1.44
11.	Scheme for maximisation of pulses production, Vamban	
12.	Scheme for improvement of millets for grain and fodder, Kovilpatti	2.64
13.	Scheme for improvement of wetland pulses, Aduthurai	3.62
14.	Scheme for Coordinated Agronomic Experiments on Sugarcane, Sirugamani	5.30
15.	Agrl. Research Station, Ramanathapuram	
16.	Scheme for surveillance of pests and diseases, Vellore	2.93

ICAR Coordinated Research Scheme (Partly financed)

1.	All India Coordinated Research Project on Agronomic Research, Coimbatore, Tanjore, Ramanathapuram, Vellore	11.48
2.	All India Coordinated Research Project on Water Management, Bhavanisagar, Madurai	13.04
3.	All India Coordinated Research Project on Dryland Agriculture, Kovilpatti	5.55
4.	All India Coordinated Research Project on under utilised/under exploited plants, Mettupalayam	2.21
5.	All India Coordinated Research Project on Sugarcane, Cuddalore	0.84
6.	All India Coordinated Research Project on improvement of soil physical conditions to increase agricultural production of problematic areas, Coimbatore	3.51
7.	All India Coordinated Research Project on micro and secondary nutrient and pollutant elements in soil and plants, Coimbatore	3.89
8.	All India Coordinated Research Project on longterm fertilizer experiment, Coimbatore	1.07
9.	All India Coordinated Research Project on Agro-Meteorology, Kovilpatti	1.74
10.	All India Coordinated Research Project on investigation of correlation of soil test with crop response, Coimbatore	3.24
11.	All India Coordinated Research Project on Oilseeds, Coimbatore, Vridhachalam, Tindivanam and Bhavanisagar	17.51
12.	All India Coordinated Research Project on Jute and Allied Fibres, Aduthurai	1.39
13.	All India Coordinated Research Project on Rice Improvement, Coimbatore, Aduthurai and Madurai	10.44
14.	All India Coordinated Research Project on Sorghum, Coimbatore	6.60
15.	All India Coordinated Research Project on Forage crops, Coimbatore	5.23

16.	All India Coordinated Research Project on Cotton, Coimbatore, Kovilpatti and Srivilliputhur	12.93
17.	All India Coordinated Research Project on Intensification of Research on the Improvement of Pulses, Coimbatore, Vamban	11.86
18.	All India Coordinated Research Project on Palm, Aliyarnagar, Aduthurai	4.08
19.	All India Coordinated Research Project on Maize, Coimbatore	1.92
20.	All India Coordinated Research Project on Small Millets, Coimbatore	4.79
21.	All India Coordinated Research Project on Acarology, Coimbatore	1.34
22.	All India Coordinated Research Project on Pesticides, Coimbatore	3.19
23.	All India Coordinated Research Project on Plant parasitic nematodes with integrated approach for their control, Coimbatore	2.54
24.	All India Coordinated Research Project on biological control of crop pests and weeds, Coimbatore	1.59
25.	All India Coordinated Research Project on Seed borne diseases, Coimbatore	1.19
26.	All India Coordinated Research Project on Mushrooms, Coimbatore	2.16
27.	All India Coordinated Research Project on Betelvine wilt disease, Sirugamani	2.09
28.	All India Coordinated Research Project on Weed control, Coimbatore	3.61
29.	All India Coordinated Research Project on Spices and Plantation Crops, Coimbatore, Yercaud	4.56
30.	All India Coordinated Research Project on Palm (Coconut), Veppankulam	5.74
31.	All India Coordinated Research Project on Vegetables including chillies, Coimbatore	3.51
32.	All India Coordinated Research Project on Cashew, Vridhachalam	2.78
33.	All India Coordinated Research Project on post-harvest technology in horticultural crops, Periyakulam	3.41

34.	All India Coordinated Research Project on Floriculture, Coimbatore	2.30
35.	All India Coordinated Research Project on Tuber Crops other than potatoes, Coimbatore	2.73
36.	All India Coordinated Research Project on Tropical fruits, Periyakulam, Coimbatore	8.91
37.	All India Coordinated Research Project on arid fruits, Aruppukottai	2.80
38.	All India Coordinated Research Project on renewable energy sources, Coimbatore	8.67
39.	All India Coordinated Research Project on farm implements and machinery, Coimbatore	13.96
40.	All India Coordinated Research Project on energy requirement in agricultural sector, Coimbatore	6.07
41.	All India Coordinated Research Project on intensive testing of power tiller and research and development of new machine to make them versatile, Coimbatore	2.81
42.	All India Coordinated Research Project on post harvest technology, Coimbatore	4.48
43.	All India Coordinated Research Project on biological nitrogen fixation, Coimbatore	2.04
44.	All India Coordinated Research Project on Agro-forestry, Mettupalayam	2.34
45.	All India Coordinated Research Project on Soybean, Coimbatore	1.33
46.	All India Coordinated Research Projects on Sub Trópical Fruits (Mango), Periakulam	12.50
47.	All India Coordinated Research Projects on Cotton - vaigai centre at Periakulam	30.41
48.	All India Coordinated Research Projects on Pearl Millets, Coimbatore	
49.	All India Coordinated Research Projects on groundnut - verification centre at Tindivanam, Vridhachalam, Aliyarnagar, Bhavanisagar	63.14

ICAR - Fully Financed Schemes

1.	All India Coordinated Research Project on National Demonstration on major food crops, Salem	1.54
2.	Krishi Vigyan Kendra, Vridhachalam and Trichi	23.30
3.	Project for breeder seeds of Annual Oil seeds Crops, Bhavanisagar and Vridhachalam	9.18
4.	Adaptive Research on Sugarcane, Cuddalore	11.48
5.	Frontline Demonstration in oilseeds, Coimbatore, Bhavanisatar, Aliyarnagar, Vridhachalam and Tindivanam	
6.	Scheme for the promotion of research and development efforts on hybrids in selected crops, Coimbatore, Bhavanisagar and Tinidvanam	31.00
7.	First line demonstration on oil seeds crops (Kharif, summer and Rabi) through Krishi Vigyan Kendras at Coimbatore, Madurai, Tiruchirapalli, Kattupakkam and Vridhachalam	6.00
8.	Scheme for production of breeder seeds of annual Kharif/Rabi oil seeds crops, Bhavanisagar and Vridhachalam	0.83
9.	Studies on seed collection, processing and standardisation of storage practicesin sylvicultural crops of economic importance, Mettupalayam	1.14
10.	First line demonstration on pulses, Rabi/Summer crop-Blackgram and Greengram, Vamban and Thanjavur	1.14
11.	Front line demonstration on oil seeds component D-Demonstrations on efficiency of Rhizobium inoculation on oilseeds under the All India coordinated Research Project on BNF, Coimbatore	0.31
12.	Front line demonstrations on oilseeds, sub-component D-Demonstration of improved package of practises for oil seeds with emphasis on balanced fertilisation through soil testing, Coimbatore	0.18

13.	Scheme for multilocation trial in sunflower (oilseeds), Coimbatore	0.05
14.	Front line demonstration for oilseeds, sunflower hybrids, Bhavanisagar	
15.	Scheme for demonstration and populatisation of imporved implements and machinary through Krishi Vigyan Kendra, Coimbatore	3.01
16.	Front line demonstrations on production potentials of oil seeds Crops-Soyabean, Coimbatore	0.82
17.	Front line demonstrations on oilseeds, sub-component D demonstrations of inter-cropping/sequence cropping systems involving oilseed crops under rainfed conditions, Kovilpatti	0.24
18.	Front line demonstration on oilseeds sub-component cropping systems research demonstration on production potential at ECF Centres, Vellore and Ramanathapuram	
20.	Front line demonstration in sunflower (oilseeds), Coimbatore	0.36
21.	Stand Alone Fuel Cell Power Plants for Rural Electrification in India, College of Agrl. Engineering, Coimbatore	0.18
22.	Front line demonstrations on pulses under National Pulses Development Project (NPDP), Coimbatore and Vamban	0.84
23.	Studies on genetic manipulation of algal symbiont *Anabaena azollae* and induction of sporulation process in Azolla	2.26
24.	Devlopment of osmoregulatory and salt resistant strains in Azosprrillum for use in problem soils at AC and RI, Madurai	2.01
25.	VA - Micorrhizae as a dynamic microsymbiont in association with horticultural crops at Horticultural Research Station, Yercaud and Regional Research Station, Palyur	0.44
26.	Use of biotechnology for disease management in rice, Coimbatore	0.54
27.	Exploiting the genetic potential of the Rhizobium nodulation *Sesbania rostrata* and *Aescaynomena indica*, Coimbatore	
28.	Genetic improvement of Rhizobium Sp (Cowpea spp). Coimbatore	0.93
29.	Creation of revolving fund for production of breeder seed of oilseeds, Vridhachalam	1.00

30.	Strengthening research capabilities for varietial improvement, testing and un-interrupted basic and breeder seed production	26.42
31.	Demonstration studies on *Gymnema sylvestre* Schult, Coimbatore	2.50
32.	Utilization of Frankia and its symbiosis with Alnus for Nilgiris, Uthagamandalam	0.63
33.	Oilseed production programme - Augumentation of irrigation facilities for breeder seed production of groundnut, RRS, Vridhachalam and CRS, Tindivanam	1.00
34.	NARP - ICAR - Strengthening of research capabilities - Basic research - Sub project on resource characterisation of rain fed farming system in peninsular India, ARS Kovilpatti	26.42
35.	Augumentation of Irrigation facilities for Breeder seed production, Tinidvanam, Vridhachalam	4.50
36.	Methane emission in rice based cropping system, Aduthurai	5.82
37.	Ecology of Termites associated & enacroles and generation of green houses grases, Coimbatore	5.11
38.	Screening of Gossypium spp. to Reniform nematode & interaction with Fungi, Coimbatore	3.51
39.	Soil Microbiological studies in High value Horticultureal crops, Coimbatore	3.89
40.	Evaluation of rice germplasm for Biotic stresses, Aduthurai	2.26
41.	Scheme for improvement of curry leaf, Coimbatore	4.39
42.	Front line demonstration of improved Agrl. Mach. for major pulses crops, Coimbatore	9.10
43.	AICRP on Groundnut - verification centre for peresud/mastard, Coimbatore, Vridhachalam	15000 / centre per year
44.	Improvement of Papaya through In-vitro cultures, Coimbatore	9.46
45.	Creation of variation for improvement of yield of coriander through mutuation Breeding	3.86

NARP Phase II Sub- Projects

I.	North Eastern Zone		
	1.	Vellore	61.58
II	North Western Zone		
	2.	Paiyur	19.38
III	Cauvery Delta Zone		
	3.	Aduthurai	22.13
	4.	Trichy	2.48
	5.	Kattuthottam	25.68
	6.	Sirugamani	36.20
IV	Western Zone		
	7.	Bhavanisagar	24.64
	8.	Mettupalayam	55.35
V.	Southern Zone		
	9.	Periyakulam	45.32
	10.	Aruppukotai	19.50
	11.	Pudukkottai	18.96
	12.	Srivilliputhur	7.90
	13.	Killikulam	7.94
VI.	Hilly and Tribal Zone		
	14.	Yercaud	43.42
	15.	Vijayanagaram	23.02
VII.	High Rainfall Zone		
	16.	Pechiparai	66.74
	17.	Thirupathisaram	21.21

Government of India Schemes

1.	Regional biogas training and development centre, Coimbatore	6.42
2.	Scheme for establishment of regional centre for fuel efficient stove technology (Technical backup support unit of National Programme on improved Chulas), Coimbatore	3.30
3.	Test kit for fermentative and methnogenic anaerobes, Coimbatore	1.42
4.	Microbiology of methane production from cattle dung, human waste, piggery waste and sago industry effluent, Coimbatore	3.37
5.	Degradation of fatty acids by syntrophic coculture in biogas digestors, Coimbatore	5.47
6.	Scheme for characterisation of transclucent prefab dome of fixed dome biogas plants in relation to selective electro - magnetic wave length filtering and resulting response microbes in general and methanogens in particular, Coimbatore	3.00
7.	Establishment of user centre at Tamil Nadu Agricultural University, Coimbatore under Bio-technology information System (BTIS) A national infrastructural facility, Bio-technology Unit, Coimbatore	11.34
8.	Biological control of insects pests through bio-technology, coimbatore	4.39
9.	Biological control of root rot diseaces of pulses and oil seeds and mass multiplication of antagonists, Coimbatore	2.75
10	Establishment of pilot plats for mass production of Trichogramma and Chrisopa and field studies with genetically improved strains, Coimbatore	4.20
11.	Establishment of Centre for Plant Molecular Biology (CPMB), Coimbatore	41.57
12.	Scheme on the technology development and demonstration project on bio - fertilizers (BGA), blue green algae, Aduthurai	17.26
13.	Selection and cloning of hyper ligninolytic streptomyces sp. for conversion of lignin rich waste (Coir dust) to energy chemicals and humus lime poly - condensates, Coimbatore	6.10

14.	Scheme for increasing the biomass of forest tree species by the use of mycorrhizal fungi, Uthagamandalam	0.52
15.	Chemical constituents of Neem and Karanja (Pungam) kernel, Mettupalayam	0.76
16.	Exploitation of symbiotic nitrogen fixation of actinorrhizal plants for afforestation and soil rehabilitation, Coimbatore	2.44
17.	Comprehensive scheme for estimating cost of production of principal crops, Coimbatore	31.80
18.	Scheme for Rice Processing and Allied Equipments, Coimbatore	3.00
19.	Plasticultural application and development in agricultural operation, Coimbatore	1.69
20.	Establishment of an advanced centre of training in water management technology of water technology centre, Coimbatore	2.21
21.	Technology extension project on agro-forestry in farments field, Mettupalayam	0.16
22.	Central sector scheme for integrated programme for the developement of spices. Scheme for production of foundation seed of Chillies and Minor Spices, Bhavanisagar	2.17
23.	Central sector scheme - Production of fruits and vegetables, Coimbatore, Palur, Periakulam	5.00
24.	Bio - control of soil borne diseases of national importance using fluorecent Pseudomanos, Coimbatore	12.45
25.	Technology extension project on agro-forestry, Mettupalayam	2.59
26.	Microbial consortia for biogas production from leafy biomass, Coimbatore	4.93
27.	Agro - climatic regional exercise to district level in Tamil Nadu, Coimbatore	1.35
28.	Genetic and biochemical basis of rice bacterial blight pathogen and interactions, Coimbatore	3.58

29.	Induced variability for the improvement of oilseeds and forage crops, Coimbatore	3.30
30.	Environmental risk assessment of pesticides used in a hill area, Nilgiris, Coimbatore	0.86
31.	Strenthening the existing facilities of the botanic gardens, Coimbatore	9.79
32.	Strengthening of plant quarantine facilities, Coimbatore	1.25
33.	Starting of experimental Agromt. Services, NCMRWF, Coimbatore	1.00
34.	DBT - Crop pest control by plant derivatives, Aduthurai	62.79
35.	Department of Waste Land Development - Agro Forestry operation Research Project, Tanjore	2.98
36.	Indian National Committee on Irrigation & Drainage comparative Evaluation and Economic apparaisal of different models of application of drip systems, Coimbatore	3.00
37.	DBT - Biological control approaches in the Management of Parthenium hysteraphorus	10.8
38.	Central Sector Scheme - Development of Medicinal Aeromatic Plants, Kodaikanal, Vijayanagaram	
39.	DST - Agro - Climatic resource analysis for rice production in Cauvery Delta, Aduthurai, Sirugamani (Sub Centre)	6.35
40.	DST - Regulatory mechanism of absorption factor associates with *Anaerobic cellulolytic* bacteria, Coimbatore	
41.	BRINS - Atomic Energy Regulatory Board - studies on transfer co efficient of radio nuclides from pastrue to cow's milk, Coimbatore	4.32

International Collaborative Scheme

1.	Scheme for Sesamum Research, Vridhachalam	2.60
2.	Oilseeds technology transfer package through mass campaign , video teaching, demonstration and small group approach, Coimbatore	7.28
3.	To test rice genotypes under low fertility conditions in different rice growing conditions of South and South East Asia, Coimbatore	0.70
4.	Net work collaborative research on green manure development and utilisation for rice based cropping systems, coimbatore	1.50
5.	Research project in collaboration with IFFRI - Transfer of agricultural technology and dynamics of information flows with in the technology sector, Coimbatore	0.01
6.	Rural infra structure and agricultural growth, Coimbatore	0.44
7.	Response of major surface irrigation system to drought, Coimbatore	1.00
8.	Modelling in irrigation investment, Coimbatore	1.00
9.	Management of small scale irrigation systems and ground water under constraints, Coimbatore	1.13
10.	Develpment and use of indigenous micrbial pathogens for the control of *Heliothis armigera* and *Spodoptera litura* in different cropping systems in South India, Coimbatore	7.00
11.	Studies on the utilisation of domestic and urban sewage and sludge and industrial waste for increasing crop production, Coimbatore	3.23
12.	Project for standardisation of seed production, processing and storage technology for tree crops, Coimbatore	14.99
13.	Constraints to higher rice yield in different rice growing regions in Tamil Nadu, Coimbatore	10.25
14.	Search for rice sheath blight resistance, Coimbatore	3.35
15.	Rice biotechnology programme consisting four sub projects, Coimbatore	15.03

16. Collaborative research project on improvement and utilisation of *Casuarina frankia* mycorrhizal symbiosis for afforestation and agro-forestry in India in the field of Science and Technology, Mettupalayam	8.37
17. Measuring sustainability in long term experiments, Coimbatore	0.73
18. Establishment of University Soil reference Centre, Coimbatore	2.19
19. NRI-ICRISAT-TNAU-resistance monitoring on *Helicoverpa*, Coimbatore	
20. IFPRI-Projection & Policy implications of medium & long term rice supply and demand, Coimbatore	
21. FF Grant 920-0880-Study on the relationship between management authority & performance in Tanks in Tamil Nadu, Coimbatore	
22. WINROCK-Natural Resource economics, Coimbatore	
23. WINROCK-Development of Agro forestry in Tamil Nadu, Coimbatore	
24. WINROCK Forestry-Neem Project network, Mettupalayam	0.44
25. IRRI-SARP Project simulation & system analysis for Rice production, Aduthurai	1.68
26. IRRI-SARP-Climate on rice production in India sub continent, Aduthurai	26400 US$
27. EEC-University of Glasgow-variability & persistance of microsymbients of *Casuarina* in relation to plantation productivity in India, Mettupalayam	28.45
28. NRI-TNAU-Development of Technology for processing & formulation of polyhydrosis virus of American Bollworm, Coimbatore	44.62

Private Agency Schemes

1.	Scheme for strengthening coffee teaching and training for the undergraduate and postgraduate degree courses in Horticulture, Yercaud	1.53
2.	Scheme for institution of professorial Chair in Agricultural Marketing, Department of Agricultural Economics, Coimbatore	1.30
3.	Establishment of a Chair of Professor of Agronomy for Research on Fertiliser use and Management, Coimbatore	0.89
4.	Research projects for maximisation of yield in rice, Coimbatore	0.75
5.	Establishment of a Chair of Professor of Agricultural Entomology, Pesticide Toxicology, Coimbatore	1.10
6.	Studies on the multi-residues of pesticides in spices, Coimbatore and Uthagamandalam	0.59
7.	Studies on the effect of alcohol distillery effluent on soil fertility status, yield of crop produce, Coimbatore	1.91
8.	Time bound project in rural development - Participation of Rural women in Development and Economics of small scale fishing development activities, Madurai	1.66
9.	Seed fortification and mid storage treatment for prolonging shelf life of crop, Coimbatore	0.69
10.	Transfer of bio-fertilizer technology of tree crop of social forestry programme for waste land improvement in certain selected areas of Tamil Nadu, Mettupalayam and Paiyur	2.50
11.	Developing Azospirillum and Azotobactor bio-fertilizer for mulberry, Paiyur	2.20
12.	Investigation on the quantitative and qualitative increase in the yield of mulberry through mycorrihizal inoculation, Paiyur	2.92
13.	Research proposal on investigation on the Polyhedrosis virus diseases in *Bombyx mori* and their management, Coimbatore	1.56

14.	Studies on foliar application of micronutrients to mulberry and its effect on economic characters of silkworm *Bombyx mori*, Coimbatore	1.56
15.	Collaborative research project on tapioca, Palur	0.76
16.	Ecobehavioural studies on the white fly, *Bemisia tabaci* G. in polycrop ecosystem, Coimbatore	9.52
17.	SPIC Chair Endowment - Professor (Soil Science and Agricultural Chemistry) Coimbatore	1.20
18.	Medicinal plant based horti-sylviculture, Periyakulam	0.72
19.	Establishment of a pilot plant for commercial production of biological control agents, Madurai and Coimbatore	81.00
20.	Investigations on the Bacterial insecticides Bacillus (B.T.K) and its efficacy in the control of certain important crop pests, Coimbatore	0.27
21.	Evaluation of biopesticide B.T. formulations for its safety to silkworm *(Bombyx mori)*, Coimbatore	0.27
22.	Seed technological evaluation for quality in cotton, Coimbatore	0.35
23.	Monitoring and surveillance of food contaminants hazards in India, Coimbatore	0.28
24.	Scheme on investigation on the microbiology of certain fruit crop and developing suitable bio-fertilizers, Madurai	1.30
25.	Studies on continuous use of Mussorie Rock Phosphate (MRP) on normal/alkaline soils and its effect on soil crop environment, Coimbatore	0.32
26.	Evaluation of revenue oriented soil conservation and water harvesting technologies at Natrampalayam mini water shed of Dharmapuri District, Coimbatore	0.42
27.	Studies on the assessment of the problems of sea water intrusion and reclamation of the east coast in Radhapuram Taluk of Tirunelveli Kattabomman District	1.25

28.	Development, performance and evaluation of package of tractor and power tiller oriented implements for mechanisation of mulberry farm, Coimbatore	1.32
29.	Evaluation of anilofos (50% EC) residues in transplanted rice, Coimbatore	0.44
30.	Studies on anaerobic treatments of Pharma waste waters, Coimbatore	0.92
31.	Biological evaluation and determination of residues of Ekalux 20 EW, Coimbatore	0.37
32.	Endowment for research on biocontrol agents, Coimbatore	0.63
33.	Application of small portable engines in farm machines suitable to Indian Conditions, Coimbatore	1.08
34.	TNSC ST-student project seed village concept for generation system of seed production, Coimbatore	0.05
35.	TNSC ST-Student project guidelines for maintaining purity and seed quality, Coimbatore	0.05
36.	Indian Bank-Pilot project on transfer of Technology in Shevroy hills, HRS, Yercaud	0.30
37.	Potash Res. Institute of India - Studies on the effect of Potash applications for early drought management in sugarcane, Coimbatore	0.58
38.	All India Bone Millers Association New Delhi - Evaluation of raw bone meal as phosphatic source for crops of different soils, Coimbatore	1.00
39.	SANDOZ - India Limited - Evaluation of SAN - 6538 I - 230 CS 045 against cotton pest, Coimbatore	1.50
40.	Society for social Forestry Research and development - A socio Economic analysis of charcocil production in Tamil Nadu Mettupalayam.	2.54
41.	Coffee Board - Improvement of Coffee processing equipments, Coimbatore	3.00

42.	ASPEE - Bombay - Influence spraying system on the efficacy of insecticides against Bollworm of cotton, Coimbatore	0.23
43.	Endowment in Botonical pesticides, Coimbatore	4.43
44.	M/s. Potash & Phosphate Institute of Canada India Programme - strengthening of Research on Phosphorous soil fertility management, Coimbatore	4.40
45.	Society for social Forestry Research and Development - Exploiting Mycrohizae for neem nursery, Coimbatore	1.05
46.	State Department of Forest - Study for Pest and disease in testing seed and seedlings of Forestry crops and evolving suitable measures for their control, Mettupalayam	2.00
47.	Physcial Research Lab. Ahmedabad. Methane flux management from Paddy soil Ecosystem, Coimbatore	1.60
48.	Tamil Nadu Newsprint and Paper Limited, Tiruchi - Characterisation of biobleaching ensyme and standardisation of production, Coimbatore	1.20
49.	CSB-Studies on the bio-ecology and management of phyto-parasitic nematodes association with mulberry, Coimbatore	4.93
50.	TNPL-Evaluation of long term effect on utilization of effluent waste for irrigation, Coimbatore	6.34
51.	White House Process - Madras - Evaluation of Textile Mill effluent, Tirur	5.30
52.	All India Areaca Growers' Association, Design & Development of sprayer for Areca plantation, Coimbatore	2.00
53.	Sakthi Sugars - Studies on the distilleries effluent based compost and its utility, Coimbatore	6.32
54.	Tunis Rock Phosphate, Coimbatore	0.63
55.	AFPRO - Utilisation of Bio-gas for heating and power generation, Coimbatore	
56.	Raj Phos - Studies on low grade Udaipur Rock Phosphate, Coimbatore	3.28

State Government Schemes

1.	On farm water management studies, Bhavanisagar	3.68
2.	Strengthening of State Land Use Board in Tamil Nadu Agricultural University, Nucleus Cell, Coimbatore	1.75
3.	Production and distribution of vegetative hedge, fodder crops and fruit seedlings and providing training, Aruppukkottai	1.00
4.	Training programme on improved Chulas, Coimbatore	0.58
5.	Agricultural Development Project - Tamil Nadu (TNADP), Seed Production by Tamil Nadu Agricultural University, Kumulur, Killikulam, Vamban and Palur	49.23
6.	Agricultural Development Project - Tamil Nadu (TNADP) - Integrated Watershed Development Component, Vellore and Athur	5.75
7.	Fodder research component under - TNADP - implementation with world bank assistance - Department of Forage Crops, Coimbatore	1.00

APPENDIX III

LIST OF BOOKS/BOOKLETS PUBLISHED

English

1 Plant chemical analysis

2. AG. Tech - Dohows for physical constraints in Tamil Nadu

3. Micronutrient research in Tamil Nadu

4. Flood relief measures for dryland crops

5. Green manures in rice based cropping system

6. Palmarosa - a new commercial crop.

7. Teak cultivation

8. A guide to the management of pests and diseases of crops

9. Pests of field crops and their management

10. Introduction to spices, plantation crops, medicinal and aromatic plants

11. Rice black bug

12. Diseases of horticultural and plantation crops

13. Design elements in landscape gardening

14. Principles of Plant Pathology

15. Water Management studies for the Soil and Water Management Research Institute farm

16. Micronutrients in mandarin oranges.

17. Sesame Post harvest analysis in Tamil Nadu

18. Cultivation practices for rice

19. Sorghum crop cultivation Technology

20. Cotton production technology

21. Cultivation practices for sunflower

22. Sericulture A to Z

23. Recent technologies in rice cultivation

24. Plant viruses and virus diseases of crop plants

25. A hand book on field crop diseases

26. Indian liberalisation policies and opportunities for agricultural exports

27. Biofertilizers for rice

28. Experimental technique of Azolla biofertilizers

29. Reading manual on extension administration

30. Green manures in rice based cropping system

31. Weed management in cropping systems in Tambiraparani command area.

32. Agricultural Meteorology

33. Rural Sociology in Extension Education

34. Rural Sociology and Psychology in Extension Education

35. Techniques and aids in Engineering Extension

36. Forest and Tribal Welfare

37. Extension teaching methods

38. Audio-visuals in Extension Education

39. A guide to the management of pests and diseases of crops

40. Crop Diseases - Innovative techniques and management

Tamil

1. மண்ணிற்கும் மகசூலுக்கும் ஏற்ற சமசீர் உரமிடல்
2. மலைத் தோட்டப் பயிர்களுக்கு உயிர் உரங்கள் இடுதல்
3. ஆரஞ்சுப் பயிர்களுக்கு இலை வழி உரங்கள் இடுதல்
4. வீட்டுத் தோட்டம்
5. மானாவாரியில் வேளாண்மை
6. பயறு வகைகளில் பூச்சிகளும் அவைகளின் கட்டுபாடும்
7. முந்திரியில் அதிக மகசூல் பெற
8. மானாவாரி மற்றும் புழுதிக்கால் நெல் சாகுபடி
9. சுவைமிகு காளான்கள்
10. நெற் பயிரில் ஒருங்கிணைந்த பயிர் பாதுகாப்புசெயல்முறை விளக்கங்கள்
11. வேளாண்மையில் ஆராய்ச்சிப் படைப்புகள்
12. நிலக்கடலை சாகுபடி முறைகள்
13. தென்னை சாகுபடி முறைகள்
14. சௌசௌ காயில் ஒருங்கிணைந்த பழ ஈ கட்டுப்பாட்டு முறைகள்
15. மலைப் பயிர்களுக்கு உயிர் உரங்கள்
16. தர்பூசனி சாகுபடி முறைகள்
17. உழவர்தின விழா மலர்
18. வாழை சாகுபடி முறைகள்
19. மாதுளை சாகுபடி குறிப்புகள்
20. கொய்யா சாகுபடி முறைகள்
21. செடி முருங்கை
22. சிறுகமணி 1 வெற்றிலை
23. எள் சாகுபடி குறிப்புகள்

24. மழையாலும் வெள்ளத்தாலும் பாதிக்கப்பட்ட பயிர்கள் சேதநிலைகளும் பரிந்துரைகளும்

25. சிப்பிக்காளான்

26. வயல்களில் எலிகளைக் கட்டுப்படுத்தும் முறைகள்

27. நெல் தரிசில் மானாவாரி நிலக்கடலைச் சாகுபடி முறைகள்

28. செவ்வாழை சாகுபடி

29. காய்கறி சாகுபடி

30. பயிர் வளர்ச்சிக்கு உயிர் உரங்கள்

31. ஊட்டகப் பற்றாக்குறை நோய்கள்

32. பூச்சி நோய் கண்காணிப்பு

33. சப்போட்டா சாகுபடி

34. எலி ஒழிப்பு

35. தமிழக வேளாண்மையில் நீர் சிக்கனம்

APPENDIX IV

List of Research Papers Published

AGRICULTURE

Biochemistry

1. Gomathinayagam, P. and R. Kasthuri. 1993. Studies on seed protein and methionine in different pulses. Paper presented in Symposium on Developments in life sciences held at Aduthurai.

2. Kalaiselvi, K. and A. Manickam. 1993. Electrophoretic and chromatographic behaviour of mungbean 2S Albumin. Proc. National Symposium on Developments in Plant Molecular Biology and Genetic Engineering, Coimbatore. Dec. 29-31, 1993. P. MB 02.

3. Kasthuri, R. and S. Sadasivam. 1993. Influence of growth regulators on plant growth and grain quality in blackgram. Presented in the Natl. Symp. on Pl. Mol. Biol. and Genet. Engg. held between Dec. 29-31, 1993 at TNAU, Coimbatore.

4. Kasthuri, R. and S. Sadasivam. 1993. Correlation studies between methionine and protein contents in different pulses. Paper presented in National Symposium on developments in Plant Molecular Biology and Gen. Engg. held at TNAU Dec. 29-31.

5. Kasthuri, R. and S. Sadasivam. 1993. Evaluation of different plant species for renewable sources of energy. Paper presented in National Symposium on developments in Plant Molecular Biology and Gen Engg held at TNAU Dec. 29-31.

6. Kasthuri, R. and S. Sadasivam. 1993. Protein profile during germination in Horsegram. Paper presented in National Symposium on Developments in Plant Molecular Biology and Gen. Engg held at TNAU Dec. 29-31.

7. Krishnaveni, S., S. Sadasivam and T. Ramanathan 1993. Determination of oil content in wide line Nuclear Magnetic Resonance Analyser. Paper presented in National Symposium on 'Oilseeds Research and Development in India; Status and strategies', Aug. 2-5, 1993, Hyderabad.

8. Krishnaveni, S. and S. Sadasivam. 1993. Characterisation of storage proteins of sunflower. National Symposium on Oilseed Research and Development in India : Status and Strategies, Aug. 2-5, 1993, Hyderabad.

9. Krishnaveni, S., S. Sadasivam and S.R. Sree Rangasamy. 1993. Effect of *Alternaria helianthi* on seed yield and oil content of sunflower. National Symposium on Developments in Molecular Biology and Genetic Engineering. Dec. 29-31, 1993.

10. Krishnaveni, S. and A. Manickam. 1993. Electrophoretic characterization of proteins in developing seeds of Guar Seeds. "National Symposium on Development in Molecular Biology and Genetic Engineering". Dec. 29-31, 1993.

11. Krishnaveni, S., A. Nirmalakumari, S.R. Sree Rangasamy and S. Sadasivam. 1993. Factors influencing *Agrobacterium* mediated transformation in tobacco. National Symposium on Developments in Molecular Biology and Plant Genetic Engineering. Dec. 29-31. 1993.

12. Krishnaveni, S. and S. Sadasivam. 1994. Synthesis and accumulation of storage proteins in sunflower. Paper presented in National Symposium on Newer Challenges in Horticulture, Agriculture and Industry. Jan. 10-13, Bangalore.

13. Krishnaveni, S., A. Nirmalakumari, S.R. Sree Rangasamy and S. Sadasivam. 1994. Genetic transformation of tomato using *Agrobacterium tumefaciens* as a versatile vector. National Symposium on 'Frontiers in Plant Science Research' Feb. 13-14, 1994.

14. Lambodar Behera and B. Thayumanavan. 1993. Carboxylesterase from *Helicoverpa armigera* (Hubner) National Symposium on Developments in Molecular Biology and Genetic Engineering. Dec 29-31, 1993.

15. Parvathy, K., L. Narayanan and L. Gothandapani. 1993. Purification and quality assessment of leaf protein from Lucerne. Presented in the National Symposium on 'Plant Molecular Biology and Genetic Engineering' held between Dec. 29-31, 1993 at TNAU, Coimbatore-3.

16. Parvathy, K. and B. Thayumanavan. 1993. A comparative study on storage proteins of minor millets. Presented in the National Symposium on 'Plant Molecular Biology and Genetic Engineering' held between Dec. 29-31, 1993 at TNAU, Coimbatore.

17. Sadasivam, S., S. Krishnaveni and P.M. Lakshmi. 1993. Glycosidase inhibitors from plant sources. *J. Ecobiol.* 5(1) 051-054.

18. Senthil, M., K. Kalaiselvi, A. Manickam, S. Palanisamy and S.R. Sree Rangasamy. 1993. Anther proteins profile in cytoplasmic genetic male sterile and fertile sorghum. National Symposium on Developments in Plant Mol. Biol. and Genetic Engineering, Coimbatore. Dec. 29-31, P. MB 03.

19. Thayumanavan, B. and S. Uthamasamy. 1993. Glutathione S-transferase and carboxylesterase activities in aphid (*Aphis gossipii Glover)* fed on cotton leaves treated with synthetic pyrethroids. *Indian H. Expt. Biol.* 31:788-789.

20. Thayumanavan, B. 1993. Salinity induced changes in lipid peroxidation and oxidative enzymes in paddy plants. Presented in the National Symposium on Plant Molecular Biology and Genetic Engineering held between Dec. 29-31 1993 at TNAU, Coimbatore.

21. Thayumanavan, B., A. Subramanian and R. Velusamy. 1993. Foliar enzyme levels and leaffolder resistance in paddy plants. National Symposium on 'Plant Molecular Biology and Genetic Engineering' held between Dec. 29-31, 1993 at TNAU, Coimbatore.

Agricultural Botany

1. Arumugachamy, S., S. Vairavan, P. Vivekanandan and S. Palanisamy. 1992. Aromatic and quality rice improvement in Tamil Nadu. *IRRN* 17(6): 11.

2. Arumugachamy, S., P. Vivekanandan and M. Subramanian. 1993. Character association and path Coefficient analysis in ratoon rice. *Oryza*, 30: 30-32.

3. Arjunan, A., K. Balakrishnan and C. Rajendran. 1993. Non destructive method of measuring volume and weight of papaya fruit. *Madras agric. J.* 80(1): 21-23.

4. Arumugachamy. S., P. Vivekanandan and M. Subramanian. 1993. Genetics of ratooning ability in rice *(Oryza sativa)*. Accepted for publication in Egyptian journal of Genetics and cytology, Egypt.

5. Arumugam Pillai, M., M. Subramanian and S. Murugan. 1993. Effectiveness and efficiency of gamma rays and EMB for chloropence mutants in upland rice. *Ann. agric. Res.* 143(3): 302-305.

6. Arumugam Pillai, M. and M. Subramanian. 1990. Induced lodging resistance in upland rice (FAO) *Mutation Breeding Newsl.* 36, June.

7. Arumugam Pillai, M., M. Subramanian and S. Murugan. 1993. Effectiveness and deficiency of gamma rays and EMS for viable Mutants in upland rice. *J. Mendel.* 10(1): 27-28.

8. Arumugam Pillai, M. and M. Subramanian. 1994. Studies on mutated sector and number of initial cells in upland rice *(Oryza sativa)*. *Ann. agric. Res.* 15(1): 72-73.

9. Balan, A and L.D. Vijendra Das. 1993. Variability in verdec. *Orissa J. of Agri Res.* 6(1-2).

10. Chidambaram S. and P. Pothiraj. 1993. A promising Sorghum Culture "SPV.881", *TNAU Newsletter* 22(9).

11. David, P.M.M. and L.D.Vijendra Das. 1993. Varietal susceptibility of cowpea accessions to defoliaters, food pod borers and cowpea different genotypes of horsegram Maciotyloma uniflorum. (Lam) mossaic. *Ann. plant Research Resistance to Insects News Letter* 19: 40-41.

12. Dharmalingam, V., and T. Ramanathan. 1993. Combining ability for yield and its components in sesame. *Oleagineux,* 48: 421-424.

13. Ganesamurthy, K., P. Ramasamy, R. Gnanam, P. Sivasubramanian, U. Selvaraj, P. Rangasamy, R. Rathnaswamy and S.R. Sree Rangasamy. 1993. Co 12 - A short duration bushy Avarai variety. *Madras Agric. J.*, 80: (5): 245-247.

14. Geetha. S., A.P.M. Kirubakaran, K. Natarajamoorthy, S. Palanisamy and A. Abdul Kareem. 1993. Path analysis in green gram genotypes in rice fallow situations. *Crop Res.*, 6(3) 557-559.

15. Govindaraj, P. and M. Subramanian. 1992. Resistance study on yellow mosaic virus in blackgram. *Agri. Sci. Digest,* 12(3): 132-134.

16. Jebaraj, S. and M. Subramanian. 1993. Inheritance of resistance to white backed plant hopper in rice. *Ann. Pl. Res. Insec. Newsl.*, 19: 95.

17. Krishnadoss, D., T.S. Raveendran and U. Selvaraj. 1993. TCHB 213, a high yielding interspecific hybrid cotton for Tamil Nadu, *Hybrid cotton Newsletter*, 2(1): 5.

18. Koodalingam, K., N. Mohammed Sheriff, N.R. Mahadevan and S. Jebaraj. 1993. Evaluation of M, ST and PST entries of cotton against leaf hopper and stem weevil. *Annual Plant Resistance to insects Newsletter*, 19:60.

19. Koodalingam, K. and A. Ramalingam. 1992. Genetics of seed cotton yield and its components in medium staple cotton (Gossypium hirsutum L.), *Orissa J. Agric. Res.*, 6(1-2): 179-185.

20. Manoharan, V. and R. Sethupathi Ramalingam. 1992. Inheritance of testa colour and pod reticulation in groundnut. *Madras Agric. J.*, 79(11): 646-648.

21. Manoharan, V., R. Sethupathi Ramalingam and S. Thangavelu. 1993. Heritability and genetic advance of some quantitative traits in spanish bunch groundnuts. *Madras Agric. J.*, 80:37-39.

22. Manoharan, V., S. Kalaimani, and R. Sethupathi Ramalingam. 1992. Skewness and genetic advance in two F2 populations of groundnut (Arachis hypogaea L). *Madras Agric. J.*, 79(7): 394-398.

23. Manoharan, V., S. Kalaimani and R. Sethupathi Ramalingam. 1993. Path analysis in the F2 population of an intersubspecific cross in groundnut. *Madras Agric. J.* 80(8): 472-474.

24. Mahadevan, N.R., S. Jebaraj, N. Mohammed Sheriff and K. Koodalingam. 1993. Screening of cotton germplasm for green leaf hopper and stem weevil. *Annual Plant Resistance to insects Newsletter*, 19:50.

25. Mahadevan, N.R., N. Mohammed Sheriff and K. Koodalingam. 1993. Reaction of long staple cotton genotypes to green leaf hopper. *Annual Plant resistance to insects newsletter*, 19:60.

26. Murugan, S. and M. Subramanian. 1993. Variability studies for polygenic traits in M3 and M4 generations of cowpea *(Vigna unguiculata L.). Crop Res.*, 6(2): 264-269.

27. Nilakanta Pillai, K., A. Thyagarajan, M. Subramanian, T.B. Ranganathan, K.S. Paramasivan and A. Govindan. 1993. 'TKM 10' - A new high yielding semi-dry rice to Tamil nadu. *Indian Farming*, 42, No.12

28. Nirmalakumari and M. Subramanian. 1993. Path analysis in Blackgram. *Madras agric. J.*, 80(4): 227-229.

29. Rajarathinam, S. and V.D. Guruswamy Raja. 1992. Correlation and path analysis in some rice varieties under alkaline stress. *Madras Agric. J.*, 79(7): 374-378.

30. Rajarathinam, S., K. Koodalingam and V.D. Guruswamy Raja. 1992. Effect of saline stress on the germination of rice. *Madras Agric. J.* 79(10): 595-597.

31. Rajarathinam, S., N. Nadarajan and Sukanya Subramanian. 1993. Genetic variability and association analysis in cotton. *J. Indian Soc. Cotton Improv.*, 18(1): 54-57.

32. Rajarathinam, S. and R. Rathinaswamy. 1992. Studies on combining ability in blackgram. *Madras Agric. J.*, 79(8): 436-439.

33. Rangasamy, M., K. Mohanasundaram, M. Subramanian, W. Wilfred Manuel, T. Sundaram, K. Ganesan, A. Ithayarajan and S. Vairavan. 1992. ASD 17: a short duration red rice variety for tail end areas of Thambirabarani delta and Kanyakumari district. *Madras Agric. J.*, 79(2): 62-65.

34. Ramalingam, J., P. Vivekanandan and C. Vanniarajan. 1992. Combining ability analysis in lowland early rice. *Crop Res.*, 6(2): 228-233.

35. Ramalingam, J., P. Vivekanandan and M. Subramanian. 1993. Combining ability in rice. *Oryza*, 30: 33-39.

36. Rajendran, C., S. Kailasam and K.M. Sundaram. 1992. Functional growth model for drymatter accumulation in sesamum. *Madras Agric. J.*, 79(4): 230-232.

37. Ramalingam, J., N. Nadarajan, R. Rangasamy and C. Vanniarajan. 1993. Genetic variability for panicle architecture in rice *Oryza sativa L. J. Bot.*, 10(1&2): 45-47.

38. Ramasamy, N.M. and A. Kalamani. 1993. Interspecific hybridization and tissue culture in groundnut. National seminar on oil seeds Research and Development in India. Status and strategies. August 2-5, 1993. Hyderabad.

39. Rangasamy, P. and S. Jebaraj. 1993. Crop Improvement in sorghum and maize. Proceedings of the papers presented in the State Level Training Programme on Millet Production held on 27-29th October, 1993.

40. Rangasamy, M., K. Mohanasundaram, M. Subramanian, W. Wilfred Manual, T. Sundaram, K. Ganesan, A. Ithayarajan and S. Vairavan. 1992. A short duration red rice variety for areas of Thamiraparani delta and Kanyakumari district. *Madras Agric. J.*, 79(2): 62-66.

41. Ramalingam, A., M. Maheswaran, M. Subramanian, A. Amirtha Deva Rathinam, Sukanya Subramanian and G. Soundarapandian. 1993. Cold tolerant MDU.4 Rice is suitable for Tamil Nadu. *Indian Farming*, 43 No.2 May, 1993. P-3-5.

42. Rajarathinam, S., K. Koodalingam and V.D. Gurusamy Raja. 1992. Effect of Saline stress on the germination of rice. *Madras Agric. J.*, 79(10): 595-597.

43. Ramasamy, P., Sukanya Subramanian, N. Sivasamy and K. Balakrishnan. 1993. Studies on regrowth rate in relation to fodder yield in Cumbu-Napier Hybrids. *Madras Agric. J.*, 80(3): 152-155.

44. Ramanathan, T. and T.K. Ramachandran. 1993. Evaluation of VCH 1, Coconut hybrids in farmers field. *Indian Coconut Journal*, 24(5): 10-12.

45. Robin, S., and M. Subramanian. 1993. Studies on the shift in association of characters in biparental progenies of Maize *(Zea mays. L). Crop Res.*, 6(2): 243-246.

46. Sankarapandian, R., D. Krishnadoss, N. Muppidathi and S. Chidambram. 1993. Variability studies in grain sorghum for certain physiological characters under water stress conditions. *Crop Improv.*, 20(1): 45-50.

47. Thirumeni, S., and L.D. Vijendra Das. 1993. Correlation studies of Pearl millet x napier grass hybrids. *Madras agric. J.*, 80(3): 165-167.

48. Vijendra Das, L.D. 1993. Genetic variability in pearl millet, Napier grass and their hybrids in quality traits. *Annals of Agrl. Res.* 15(1).

49. Vijendra Das, L.D. 1993. Cytology of some Cenchrus grasses. *'The nucleus'* 36(1&2): 68-72.

50. Vijendra Das, L.D. and A. Alwar Arunachalam. 1993. Effect of green manure on rice crop in Tambirabarani basin area. Proc. 80th session of *Indian Science Congress* Goa. 3-8 January, 93 P. 155.

51. Vindhiyavarman, P. and K. Paramasivam. 1992. Genetic Architecture of yield and quality characters in groundnut. *Madras Agric. J.*, 79(2): 688-694.

52. Vindhiyavarman, P. and T.S.Raveendran and T. Ganapathi. 1993. Inheritance of rust resistance in groundnut. *Madras Agric. J.*, 80(3): 175-176.

53. Vairavan, S., S. Arumugachamy, P. Vivekanandan, A.P.M. Kirubakaran Soundararaj, S. Giridharan, S. Palanisamy, A. Abdul Kareem and S. Chelliah. 1993. ADT 41 (JJ 92) a short duration Basumathi rice for Tamil nadu, India. *IRRN* 18(3): 18.

54. Vanniarajan, C., P. Vivekanandan and J. Ramalingam. 1993. Spectrum and frequency of chlorophyll and viable mutations in M2 generation of Blackgram. *Crop Improv.*, 20(2) : 215 - 218.

55. Vanniarajan, C., P. Vivekanandan and J. Ramalingam. 1993. Gamma ray and ethyl methane sulphate induced sterility in blackgram. *Crop Res.*, 6(3): 560-562.

56. Vivekanandan, P. and Sukanya Subramanian. 1993. Genetic divergence in rainfed rice. *Oryza*, 30: 60-62.

57. Wilfred Manuel, W., and M.N. Prasad. 1992. Combining ability and heterosis in rice *(Oryza sativa L.)*. *Oryza*, 29: 15-18.

58. Wilfred Manuel, W., and M. Rangasamy. 1993. Restorers and maintainers for cytoplasmic male sterile (CMS) lines in rice. *IRRN* 18(4): 5-7.

AGRICULTURAL ECONOMICS

1. Balakrishnan, V. and K.N. Selvaraj 1993. Export performance of Cardomom in India. *Agricultural Marketing Journal* - January - March 1993.

2. Devarajan, S. 1993. An economic analysis of Marine Product Export in Tamil Nadu - *Madras Agricultural Journal* 80(1).

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